S740277-RPT-05
PNNL-28626

Research Technology Laboratory (RTL) Disposition Program Final Status Survey Report

S740277-RPT-05

April 2019

EC Golovich
AL Bunn
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JK Snelling

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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operated by
BATTELLE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC05-76RL01830

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Revision Table

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Executive Summary

As part of the Battelle Facility Restoration Program (Smoter and Biebesheimer 2017), the Research Technology Laboratory (RTL) Complex was remediated through demolition and surveyed to show it meets the radiological release criteria for unrestricted use under the clearance process[1] (DOE 2011). The restoration program has directed the implementation of the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) methodology (NRC 2011) to verify the suitability of the site to be released for unrestricted use under the clearance process in U.S. Department of Energy (DOE) Order 458.1 (Biebesheimer 2018a; DOE 2011). The use of MARSSIM is accepted by federal and state agencies, including DOE. This report documents how the MARSSIM process was used to assure any residual radioactivity is within acceptable levels and as low as reasonably achievable.

Past land use for the RTL Complex property included agricultural, residential, and industrial activity. The historical site assessment (HSA) (Lindenmeier et al. 2015; Biebesheimer 2018b) identified use of radionuclides in past RTL Complex research and development activities from commissioning in 1966 until it was vacated in 2017. Based on the information provided in the HSA, the RTL Complex was delineated into six survey units. The 520 building footprint, tank vault and 530 building footprint, other building footprints, and pipeline survey units included excavated areas. The paved areas and open areas survey units were unexcavated areas. Survey units were all determined to be Class 3, with low probability of containing residual radioactivity, after demolition of the structures within the RTL Complex.

Authorized radiological release limits were developed and approved by the DOE Office of Science in December 2016 (DOE 2017). Table ES.1 lists the authorized release limits for the RTL Complex. Action levels were established at 75% of the authorized limits and are also given in Table ES.1.

Table ES.1. Release limits and action levels for radiological contaminant of potential concern

Radionuclide	Release Limit[(a)] (pCi/g)	Action Level (pCi/g)
Plutonium-238	800	600
Plutonium-239/240	740	555
Plutonium-241	30,000	22,500
Uranium-234	700	525
Uranium-235	60	45
Uranium-238	280	210
Cobalt-60	3.7	2.8

(a) Release limit is synonymous with authorized limit and derived concentration guideline levels associated with 25 mrem/yr; sum of fraction applies (Ikenberry 2016).

[1] *Clearance* is the removal of property that contains residual radioactive material from DOE radiological control under 10 CFR 835 and DOE O 458.1.

The *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan* (Bunn et al. 2018) was designed and conducted to provide quantitative data regarding the residual radioactivity present in each survey unit. Fourteen random sample locations were identified within each survey unit. Forty-four specific judgmental sample locations were selected across the site based on information in the HSA. The number of sample locations within a survey unit ranged from 15 to 28 (given in Table ES.2), for a total of 127 random and judgmental sample locations identified across the RTL Complex. Sampling for the final status survey occurred over 12 days between November 11 and December 7, 2018. Laboratory results were independently validated by Analytical Quality Associates prior to evaluation.

All of the over 880 residual radioactivity measurements were less than the release limits and action levels established through the RTL Disposition Program. A sum of fractions calculation for each survey unit resulted in values that were less than unity, this is indicated in Table ES.2 by a *Pass* designation. Based on the results presented in this report, the restoration program recommends that the RTL Complex be released for unrestricted use.

Table ES.2. Summary of RTL Complex Final Status Survey Results

Survey Unit	MARSSIM Class	Number Locations Sampled	Number of Results Less than Action Level[(a)]	Pass/Fail
520 Building Footprint	3	28	196	Pass
Tank Vault and 530 Building Footprint	3	17	119	Pass
Other Buildings Footprint	3	21	147	Pass
Pipelines	3	23	161	Pass
Paved Areas	3	23	161	Pass
Open Areas	3	15	105	Pass
Total	-	127	889	-

(a) All radiological contaminants of potential concern were measured at each sampled location, providing seven results for one location.

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Acronyms and Abbreviations

AEC	Atomic Energy Commission
BMI	Battelle Memorial Institute
COPC	contaminant of potential concern
DAC	Douglass Aircraft Company
DCGL	derived concentration guideline level
DOE	U.S. Department of Energy
DQI	data quality indicator
DQO	data quality objectives
ENC	Exxon Nuclear Company
EPA	Environmental Protection Agency
FSS	final status survey
HSA	historical site assessment
LCS	laboratory control sample
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	minimum detectable concentration
NAD	North American Datum
NRC	Nuclear Regulatory Commission
PNNL	Pacific Northwest National Laboratory
RPD	relative percent difference
RTL	Research Technology Laboratory
VSP	Visual Sample Plan

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1.0 Introduction

The decisions and results documented throughout this report are based on use of the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM; NRC 2000) process as directed by the U.S. Department of Energy (DOE) Pacific Northwest Site Office and implemented by Pacific Northwest National Laboratory (PNNL) to demonstrate that residual radioactivity is within acceptable levels and as low as reasonably achievable at the site that once was the Research Technology Laboratory (RTL) Complex.

As part of the Battelle Facility Restoration Program (Smoter and Biebesheimer 2017), the RTL Complex was remediated through demolition and surveyed to show it meets the radiological release criteria in accordance with DOE Order 458.1, *Radiation Protection of the Public and the Environment* (DOE 2011). The restoration program has directed the implementation of the MARSSIM methodology to verify the suitability of the site to be released for unrestricted use under the clearance process[1] in DOE Order 458.1 (Biebesheimer 2018a). The use of MARSSIM is accepted by federal and state agencies, including DOE.

As described in the *Battelle Facilities Restoration Program Management Plan Volume I* (Smoter and Biebesheimer 2017), the programs objectives are:

- "Unrestricted use" status for the real property asset. That is, the assets (including all building structures, components, and/or associated land) will be available for any use or disposition (e.g., sale, transfer, demolition, waste disposal) without regulatory restriction, permits, or licenses that are associated with potential radiological contamination of the facility.
- Acceptably low residual financial and regulatory risk to Battelle or DOE under applicable environmental, safety, and health regulations that are associated with legacy radiological contamination.

The *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition* (Biebesheimer 2018a) describes the methods used to develop the basis for release of the RTL Complex for unrestricted use. Historical records were evaluated and documented as part of the historical site assessment (HSA; Lindenmeier et al. 2015; Biebesheimer 2018b) and are summarized in Section 2.0. Information gathered during the HSA development was used to design the Final Status Survey (FSS) described in the *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan* (FSS plan; Bunn et al. 2018).

The intentions of this report are to:

1. Summarize the evaluation to review the acceptability and suitability of survey data for decision-making purposes. This assessment was conducted by evaluating the survey data in respect to the data quality objectives (DQOs; Section 3.0), the FSS design and performance (Section 4.0), and the results of a data quality assessment (Section 5.0).

2. Describe the results of the FSS performed to characterize any potential residual radioactivity at the RTL Complex (Section 6.0) and conclude, by rejecting the null hypothesis, that the RTL Complex is ready to undergo release for unrestricted use following the clearance of property requirements described in DOE Order 458.1.

[1] *Clearance* is the removal of property that contains residual radioactive material from DOE radiological control under 10 CFR 835 and DOE O 458.1.

2.0 RTL Facility and Operations

2.1 Historical Land Use

Past land use for the RTL Complex site included agricultural, residential, and industrial activity. Former land use is important to consider when evaluating the types of contamination potentially present in the soil (Snelling and Bunn 2018).

Review of historical maps and aerial imagery dating to 1930 revealed agricultural land near the RTL Complex (Figure 1). Agricultural fields were likely associated with the farmhouse adjacent to the northeast corner of what is now the RTL Complex. The 1930 aerial imagery shows a portion of the agriculturally developed land, including an orchard (to the southwest of the farmhouse); however, the 1943 aerial imagery shows the land consisting predominantly of plowed fields or pasture (Snelling and Bunn 2018).

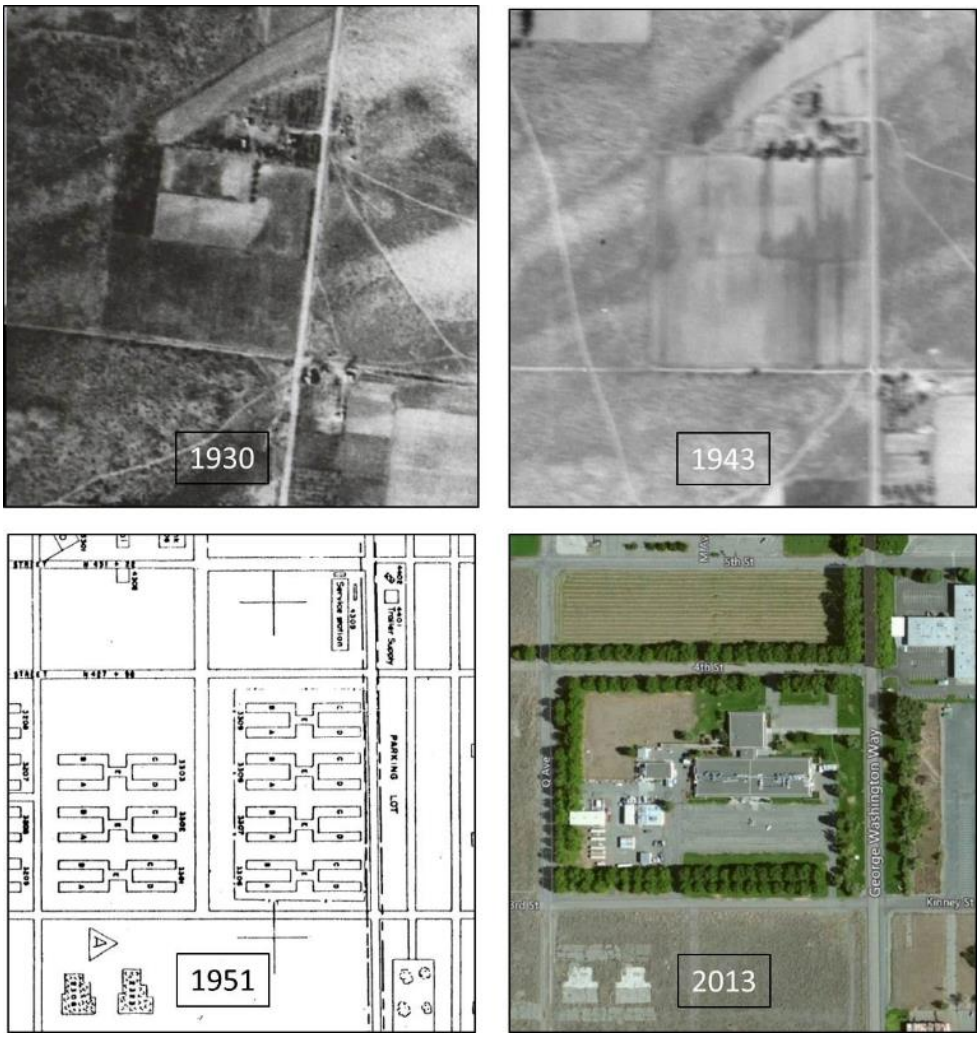

Figure 1. Former land use of the RTL Complex property included agricultural, residential, and industrial activity

After World War II, North Richland (including the area where the RTL Complex is located) became the site of the North Richland Construction Camp. From 1947 until its demolition prior to 1955, the barracks located on the site of the RTL Complex were used to house construction workers for the North Richland Construction Camp and then housed unmarried enlisted men at the U.S. Army's Camp Hanford (Figure 1). At its largest, the Construction Camp was home to as many as 13,750 people. Construction Camp facilities included over 200 prefabricated houses, 80 barracks, 2,200 trailer sites, bathhouses, a mess hall, a hospital, a school, a post office, a fire station, a patrol station, and numerous commercial and recreational establishments. When the Hanford Site expansion was completed, the surplus land and facilities were transferred to the U.S. Army to house personnel brought in to operate anti-aircraft artillery defenses for Hanford (Harvey 2000).

After decommissioning Camp Hanford in 1961, the U.S. Army demolished most of the buildings and transferred the land back to the Atomic Energy Commission (AEC), which then transferred the property to the City of Richland for economic development. The barracks buildings located at the site were demolished by 1955, and underground utilities were abandoned in place. In 1964, Douglas United Nuclear won the contract to build a high-technology product development business on 117 acres of the former Camp Hanford, which became the Donald W. Douglas Laboratories (Harvey et al. 2017). This facility was called the RTL Complex.

The Donald W. Douglas Laboratories was one of four economic diversification projects undertaken by the AEC in 1965. Completed in 1966, Building 520, the Energy and Waste Cleanup Research Facility, was one of the first two buildings (along with Building 560) constructed in the complex. The remainder of the buildings in the RTL Complex were secondary support facilities that consisted of warehouses, storage, utilities, and craft shops added over the next 10 to 15 years (Harvey et al. 2017). Douglas Laboratories used the facilities for the fabrication of prototype reactor fuels and for the development of small batteries for potential use in health care (Lindenmeier et al. 2015; Biebesheimer 2018b).

Douglas United Nuclear operated the facility until 1975, when it passed custodianship of the complex to Exxon Nuclear Company (ENC; Lindenmeier et al. 2015). ENC used the RTL Complex for the development of processes and techniques aimed at the fabrication of Sphere-PAC nuclear fuels, as well as various other nuclear fuel development research projects (Biebesheimer 2017, 2018b; Lindenmeier et al. 2015).

In 1981, Battelle Memorial Institute (BMI) purchased the RTL Complex from ENC and used the facility for numerous research and development purposes in the areas of material science, engineering, and management of natural resources for solving environmental problems. These activities were monitored to provide indications of radiological releases in accordance with applicable permits, which are summarized annually (Duncan et al. 2017).

2.2 RTL Complex Site Description

The RTL Complex is located within the Richland, Washington city limits and within the urban expansion area identified by Benton County, Washington (Benton County 2011; City of Richland 2014). This parcel is currently identified as *Business Research Park* and *General Commercial* by the City of Richland and Benton County, respectively. The RTL Complex is bounded to the south by properties owned by the City of Richland, Washington State University, and other commercial and private entities.

The BMI-owned RTL Complex property and the facility's spatial relationship to the rest of the PNNL campus are outlined in pink in Figure 2. Prior to demolition, the RTL Complex was composed of 10 buildings (510, 520, 524, 530, 540, 550, 560, 570, 580, and 590) on the 15.2-acre property. In addition to buildings, there was a tank vault (along the northwest wing of RTL 520), underground piping (asbestos pipe, hot/chilled water pipeline chase way, and sewer line), parking lots, and open areas. Figure 3 shows the locations of the buildings in the RTL complex prior to demolition.

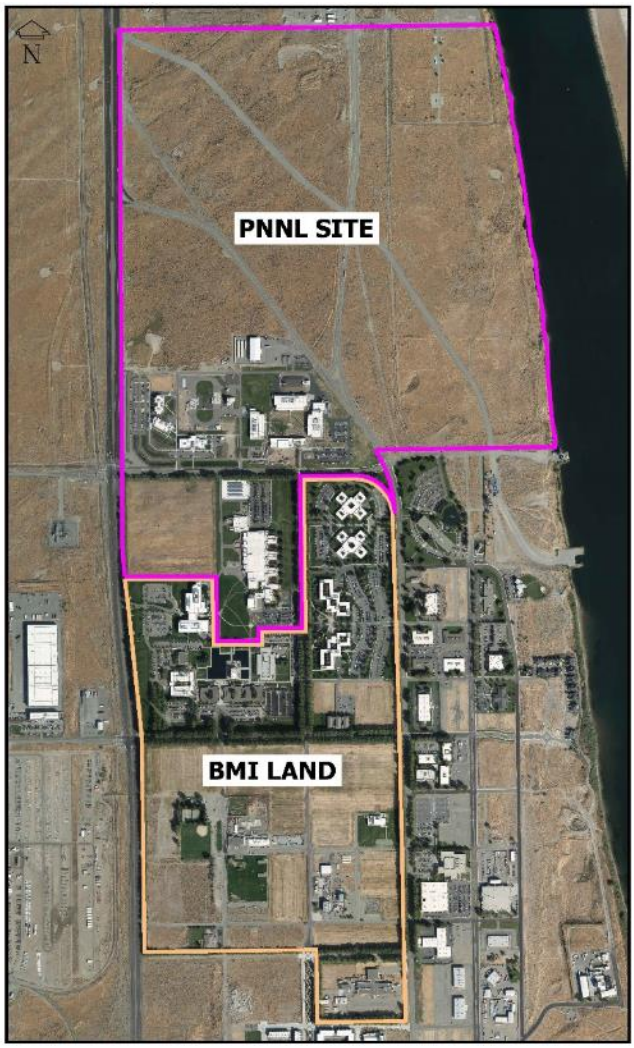

Figure 2. PNNL site and the location of the RTL Complex

Figure 3. Layout of the RTL Complex prior to demolition

2.3 Past Research Activities

The RTL520 Building was the primary facility of the RTL Complex. The Complex was built in 1966 by the Douglas Aircraft Company (as described in DAC 1967) as the company's diversification commitment to the Richland Operations Office of the AEC (Moore 1964). The RTL Complex was a branch of the research and development section of the Missile and Space Systems Division of Douglas Laboratories. Information derived from Douglas Laboratories' special nuclear material license application to the AEC (DAC 1967) indicated that its operations involved the use of hundreds of grams of plutonium-238 and plutonium-239, and kilograms of uranium-235 and uranium-233 for fabrication of prototype reactor fuels. Douglas Laboratories also was involved in the development of Betacel® batteries using promethium-147 as the most promising power source for use in cardiac pacemakers. These batteries were tested in clinical studies in both Europe and the United States during the early 1970s (Smith et al. 1975). The promethium-147 was obtained during isotopic separations associated with Hanford plutonium production during the 1960s, when operations at Hanford and Oak Ridge developed the necessary technologies for large-scale production at Hanford (Moore 1964).

Douglas Laboratories operated the facility until 1975, when it passed custodianship of the complex to ENC. No documentation describing this transition was identified during the preliminary HSA. An internal ENC document (ENC 1980) noted that significant surface

decontamination was performed in hot labs 134 and 136, and some residual, non-smearable promethium-147 and plutonium-238 contamination remained in the duct work prior to building acquisition in 1975.

ENC used the facility as described in ENC 1982 for development of processes and techniques for the fabrication of Sphere-PAC nuclear fuels. The Sphere-PAC technology, used to create spherical particles of uranium oxide fuel as opposed to conventional pellet fuel, was developed at Oak Ridge National Laboratory and transitioned to RTL for pilot-scale production. Information from Exxon's application for radioactive material license (ENC 1982) after it acquired the building allowed for significant quantities—in the thousands of kilograms—of depleted and natural uranium to be used as well as hundreds of grams of uranium-234 in its Sphere-PAC process development.

After spheres were produced in the pilot operation, they were transferred to the Sphere-PAC Auxiliary Building (RTL 570) for drying, calcining, and sintering. At the time of this operation, the building was equipped with a pusher sintering furnace and three bench hoods for drying, calcining, inspection, and material transfers (Felt 1980). All previously installed Sphere-PAC equipment was dismantled and removed from the building prior to 1984 (PNL 1984).

BMI purchased the facility in 1981 and allowed ENC to operate under a lease agreement until it vacated the facility in 1983 (Woods 1983).

2.4 Deactivation, Decommission, Decontamination, and Demolition

In September 2017, the RTL Complex was transitioned to CH2M Hill Plateau Remediation Company for internal decontamination in accordance with the *Statement of Work CHPRC IWO for RTL Complex D4 Mobilization, Isolation, and Internal Remediation* (PNNL 2017a). All buildings on the site were demolished to grade in July 2018 (see Figure 4), and work commenced on subsurface demolition as described in the *Statement of Work CHPRC IWO for RTL Complex D4 Demolition & Subsurface Soil Remediation* (PNNL 2017b, 2018a). As shown in Figure 5, subsurface demolition was completed in September 2018 (PNNL 2018b). After demolition was complete, sampling was conducted in accordance with the FSS plan (Bunn et al. 2018). In January 2019, the RTL Complex was transitioned back to PNNL to be released for unrestricted use in accordance with the process described in the *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition Program* (Biebesheimer 2018a).

Figure 4. Above-grade demolition of RTL Complex structures was completed in July 2018

Figure 5. Subsurface remediation was completed in October 2018

3.0 Data Quality Objectives

Data quality objectives for the RTL Complex are documented in *Research Technology Laboratory (RTL) Disposition Program: Data Quality Objectives (DQOs)* (Snelling and Bunn 2018) using the systematic seven-step process outlined in Appendix D of MARSSIM, *The Planning Phase of the Data Life Cycle* (NRC 2000). The DQOs are qualitative and quantitative statements developed to establish the type, quantity, and quality of data required support the radiological release decision for the RTL Complex.

3.1 State the Problem

The problem statement for release of the RTL Complex is as follows:

PNNL must collect a sufficient quantity and quality of radiological data to demonstrate the RTL Complex can be released for unrestricted use after demolition and excavation activities are complete.

3.2 Identify the Decision

Table 1 reflects the principal study questions, alternative actions, and decision statements for this project.

Table 1. Principal study questions, alternative actions, and decision statements

Principal Study Question	Alternative Actions
Does residual radiological contamination observed in the survey unit(s) meet the RTL Disposition Program objectives for the RTL Complex to be released for unrestricted use and not pose a potential impact to human health or the environment?	**Yes**: If it is determined that there is no radiological contamination that exceeds release limits, then the RTL Disposition Program will recommend that the RTL Complex be released for unrestricted use. **No**: Additional actions will be required prior to release of the RTL Complex.
Decision Statements	
Decision I: Determine that radiological contamination does not exist at a level that could impact release of the RTL Complex for unrestricted use and pose a potential impact to human health or the environment. Decision II: Determine whether the project has demonstrated the RTL Disposition Program meets release limits (DOE 2011, 2017) requirements for radiological contamination.	

3.3 Identify Inputs to the Decision

The following data were identified as required to resolve the decision statements described in Table 1:

1. Established release limits for the radiological COPCs for making the release decisions for RTL Complex survey units.

2. Designation of survey units as Class 3, under MARSSIM (NRC 2000).

3. Collection of simple random samples throughout each survey unit to satisfy the statistical tests required to evaluate the potential risk to human health or the environment.

4. Collection of specific judgmental samples in areas based on past information and professional judgement.

5. Identification of analytical testing methods capable of detecting and quantifying the COPCs in site media at required levels.

6. Assurance that collected data are usable for making the release decisions for RTL Complex survey units.

The MARSSIM process often includes developing an exposure scenario and dose model to derive these levels [authorized limits or derived concentration guideline levels (DCGLs)]. The release limits for the radiological COPCs in soil samples listed in Table 2 are conveyed in the *Authorized Limits for Radiological Clearance of the Research Technology Laboratory (RTL) Site, Pacific Northwest National Laboratory* (Ikenberry 2016). These authorized release limits were approved by the DOE Office of Science in December 2016 (DOE 2017). Action levels for radiological COPCs are set at 75% of the release limit and are also listed in Table 2. As described in Section 1.2 of *Research Technology Laboratory (RTL) Disposition Program: Data Quality Objectives (DQOs)* (Snelling and Bunn 2018), the term action level is a concentration in the soil that requires further investigation before the land can be released for unrestricted use. In addition to the action levels and release limits, the unity rule for the sum of fractions also applies.

Additional details regarding the inputs 2 through 6 are discussed as part of the survey design in Section 4.0.

Table 2. Release limits and action levels for radiological COPCs

Radionuclide	Release Limit [(a)] (pCi/g)	Action Level [(b)] (pCi/g)
Plutonium-238	800	600
Plutonium-239/240	740	555
Plutonium-241	30,000	22,500
Uranium-234	700	525
Uranium-235	60	45
Uranium-238	280	210
Cobalt-60	3.7	2.8

(a) Release limit is synonymous with authorized limit and DCGL associated with 25 mrem/yr; sum of fractions applies (Ikenberry 2016).
(b) The administrative constraint set to 75% of the release limit; sum of fractions applies.

3.4 Define the Study Boundaries

Spatial boundaries for survey and release of the RTL Complex include the survey units and the maximum lateral and vertical extent of each COPC for making the release decisions for RTL Complex survey units. The legal boundary of the RTL Complex is the horizontal extent. Vertical extent depends on the footprint of excavation.

The temporal boundaries are dictated by the program schedule.

3.5 Develop a Decision Rule

The scale of decision making in Decision I (Table 1) is defined as the RTL Complex. Any contaminant determined to exceed the release limit at any location within the RTL Complex will cause the determination that the RTL Complex is contaminated and needs further evaluation. The scale of decision making for Decision II (Table 1) is defined as each survey unit within the RTL Complex.

The decision rule associated with Decision I is as follows:

- **IF** it is determined that contamination exceeds the release limit within the spatial boundaries of the RTL Complex, **THEN** the following shall be investigated to determine whether further remedial action is needed to meet the release objectives:
  - Is the contamination representative of environmental conditions at the RTL Complex or within the region?
  - Is there a flaw in the conceptual site model?

The decision rules associated with Decision II are:

- **IF** a survey unit COPC concentration does not exceed the action level, **THEN** the survey unit will have met release objectives.
- **IF** a survey unit COPC concentration at a sample location exceeds the action level, but not the release limit, **THEN** other investigations may be necessary to determine if the results are an indication that the area within the survey unit may not meet release objectives.
  - The investigations include, but are not limited to, evaluating the results from the analytical laboratory to confirm that the measurement meets quality control criteria; performing additional statistical analyses of the results to understand the concentrations across the survey unit; or conducting more excavation or sampling. For the radiological COPC, the statistical analyses would determine if the mean concentration for the survey unit (NRC 2000) exceeds the action level.
- **IF** the survey unit COPC concentration exceeds the release limit, **THEN** the area will be evaluated to determine if the statistical results (as described above) exceed the release limit.
  - Further actions could include excavation and/or resampling (judgmental sampling in accordance with a Class 1 survey unit for radiological COPCs). The follow-up sample results will be statistically evaluated as described above and compared to the release limit.

Action levels were established to make certain the release limits were not exceeded. The release plan set the action levels at 75% of the release limits. Any sampling result greater than

the action level would require further characterization to verify the measurement and determine if additional action, such as remediation, was necessary.

3.6 Specify Limits on Decision Errors

The null hypothesis statement for the RTL Complex is *the survey unit has concentrations of a COPC greater than the release limit for the COPC*. A decision error occurs when the decision maker rejects the null hypothesis when it is true (Type I, or alpha error), or accepts the null hypothesis when it is false (Type II, or beta error). Tolerable probabilities for falsely rejecting positive and negative values were both set to 0.05 (5%) for this study and are consistent with standard radiological COPC guidance (DOE 2011). These values were used to determine the required number of samples in the FSS plan (Bunn et al. 2018).

3.7 Optimize the Design for Obtaining Data

The DQOs were used to establish a resource-effective survey design. The survey units were designed to address the heterogeneity of the environment and reflect the past uses of the land. The desktop software package Visual Sample Plan (VSP; https://vsp.pnnl.gov/, Version 7.9; Matzke et al. 2014) was used to determine the number of random samples to collect for each survey unit and to generate a set of random sampling locations for each survey unit. A minimum of 14 samples were calculated for each survey unit as shown in the Section 3.2 and Appendix A of the FSS plan (Bunn et al. 2018).

In addition to the random samples, specific judgmental samples were identified due to operational knowledge of the RTL Complex as described in the *Final Historical Site Assessment Report* (Biebesheimer 2018b). The total number of samples in each survey unit ranged from 15 to 28, including random and specific judgmental samples. Additional discussion of sample locations is found in Section 4.2 and Appendix A.

4.0 Survey Design

Based on the information documented in the *Final Historical Site Assessment Report* (Biebesheimer 2018b), the FSS plan (Bunn et al. 2018) was designed and conducted to provide quantitative data on the presence of residual radioactivity.

4.1 Survey Units

The RTL Complex was delineated into six survey units based on MARSSIM (NRC 2000) recommendations for site classification. Each of these survey units describes an area with an equivalent likelihood of having certain contaminants present due to the processes that occurred at that location. Another reason for defining survey units is to assure that the probability for detecting potential contaminants throughout the area is equivalent (NRC 2000). The survey units for the RTL Complex are Class 3, following demolition of buildings of the RTL Complex. As described in MARSSIM, Class 3 areas are impacted areas that have a low probability of containing residual radioactivity (NRC 2000).

The six survey units within the RTL Complex can be classified as either excavated areas or unexcavated areas. Excavated areas include the following:

- RTL 520 building footprint (Figure 6A)
- RTL tank vault and RTL 530 building footprints (Figure 6B)
- RTL 510, 524, 540, 550, 560, 570, 580, and 590 building footprints (Figure 6C)
- Pipelines (Figure 6D)

Based on reviews of available information (Lindenmeier et al. 2015; Biebesheimer 2018b), the unexcavated areas are not likely to be contaminated. Unexcavated areas include the following:

- Paved areas (Figure 6E)
- Open areas (Figure 6F)

4.2 Sample Locations

Random and specific judgmental sample locations for the RTL Complex are shown in Figure 7. Sampling locations for random sample locations and specific judgmental sample locations are presented by survey unit in Appendix A.

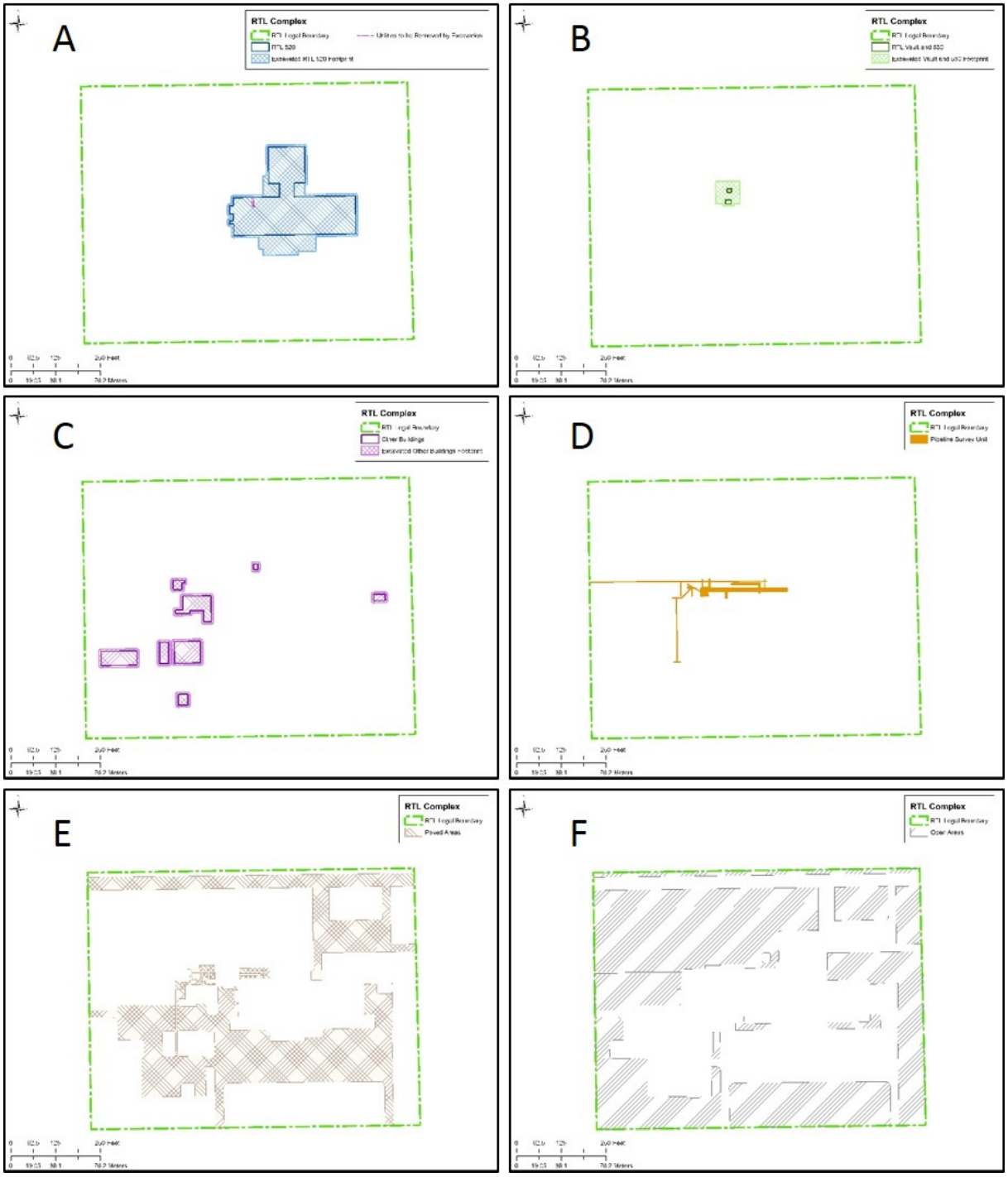

Figure 6. Survey units for RTL Complex: RTL 520 building footprint (A); RTL tank vault and RTL 530 building footprints (B), RTL 510, 524, 540, 550, 560, 570, 580, and 590 building footprints (C); pipelines (D); paved areas (E); and open areas (F)

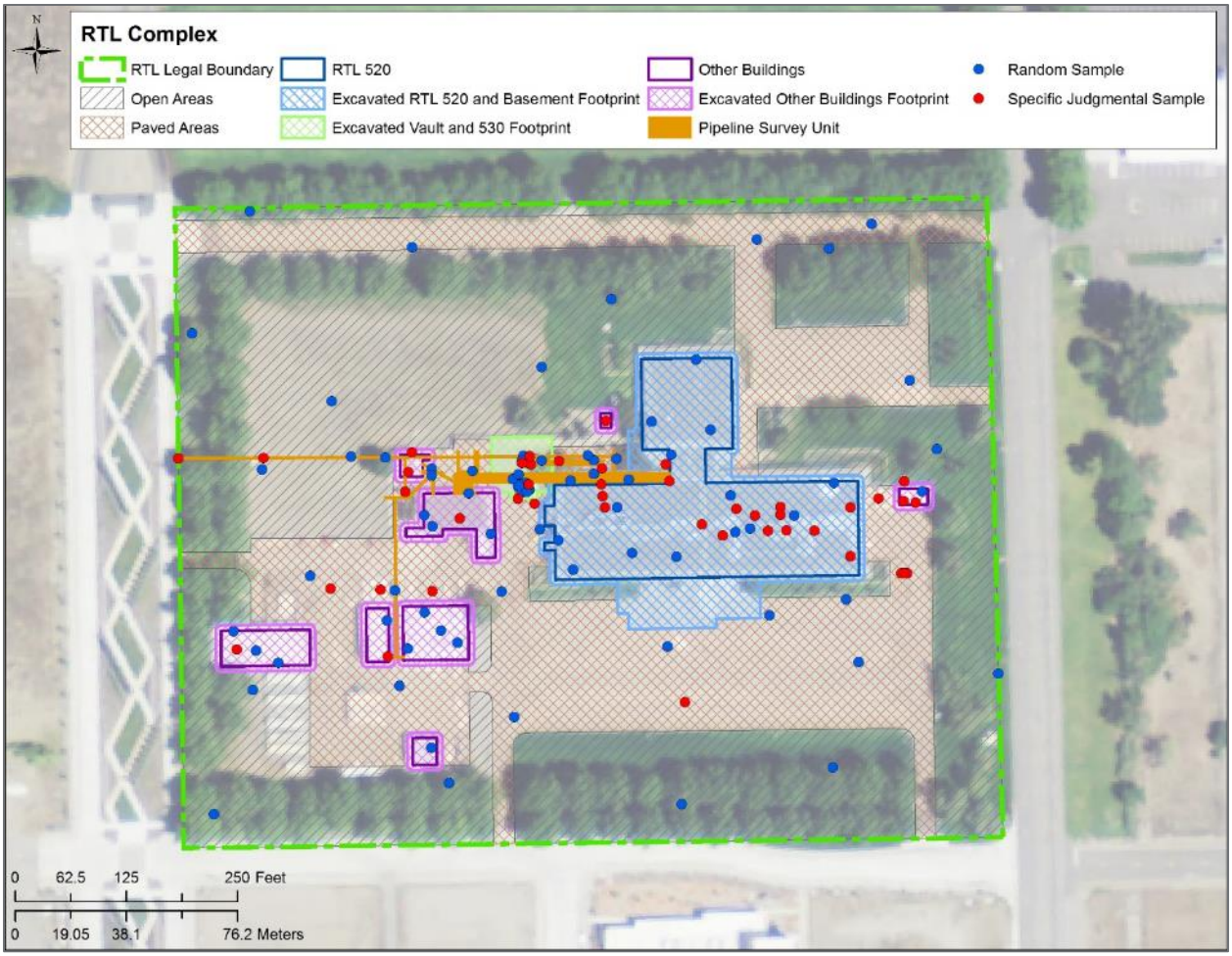

Figure 7. Summary of all random and specific judgmental samples for the RTL Complex

4.3 Analysis Methodology

Table 3 presents the radiological COPCs, the analytical technology used by TestAmerica, Inc. at their Richland, WA, location, and the required quantification limit as stated within the DQOs (Snelling and Bunn 2018). TestAmerica Inc. is accredited by the Washington State Department of Ecology and the ANSI National Accreditation Board (ISO/IEC 17025:2005 and DOECAP/DoD) in the field of testing for the radiological tests performed. The required quantification limits are 10% of the release limits for radiological COPCs in soil. Discussion of actual minimum detectable concentrations reported by the laboratory are discussed in Section 5.1.6.

Table 3. Analytical technology and required quantification limits for radiological COPCs

Analytical Technology	COPC	Required Quantification Limit [(a)] (pCi/g)
Alpha Spectroscopy	Plutonium-238	80
	Plutonium-239/240	74
Liquid Scintillation Counting	Plutonium-241	3000
Alpha Spectroscopy	Uranium-234	70
	Uranium-235	6
	Uranium-238	28
Gamma Spectroscopy	Cobalt-60	0.37

(a) 10% of the release limits. This is the most conservative approach based on MARSSIM (NRC 2000).

4.4 Layback Scoping Study

This section describes the sampling and analysis of layback soil as part of a scoping study for the RTL Complex (Bunn 2018). The scoping study was designed to meet the requirements of the FSS plan (Bunn et al. 2018). Layback is defined as “clean” material resulting from excavation (DOE/RL-96-22). For the RTL Complex, layback soil was removed as part of the excavation of the RTL 520 building to create a slope upon which the soil will not fall back or collapse into the excavation pit. The objective of the scoping study was to verify that the layback soil does not contain COPCs that are above the action levels and release limits for the disposition of the RTL Complex, meet the sum of fraction requirements, and can be used to backfill the excavated areas that meet the criteria for unrestricted use in accordance with the *Battelle Facilities Restoration Program Management Plan Volume I* and the *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition Program* (Smoter and Biebesheimer 2017; Biebesheimer 2018a).

4.4.1 Layback Soil Piles

The layback soil consists of soil removed from the RTL 520 survey unit. The soil was removed from excavation area around the RTL 520 basement. The layback did not include soil from around the RTL 520 tank vault and excavated pipelines survey units, or from any other areas of known potential contamination sources.

The layback soil was estimated to be 4,000 cubic yards of soil. The soil volume exceeded the area available between predetermined sampling locations for staging the soil in one pile, so two layback staging areas within the open and paved areas survey units were used for piling the layback soil.

The process of removing the soil from the excavation area within the RTL 520 survey unit mixed the soil into heterogeneous piles. Heavy equipment was used to remove the soil and place it in a pile close to the excavation area, and then to move and consolidate the soil into two piles in the open areas and paved areas survey units. The layback piles did not cover any of the sampling locations identified in the FSS plan.

4.4.2 Layback Sample Locations

The minimum number of random samples calculated for the layback soil was 14, the same as in the FSS survey units. The assumptions for calculating the number of random samples for the layback scoping study were the same as stated in the FSS plan (Bunn et al. 2018).

The random sampling approach to select sample locations and meet the criteria for statistical evaluation was based on the use of a random number table. The piles were of an irregular configuration. Location of sampling was divided based on the side of the pile (north, south, east, west) and the vertical height of the pile (top, middle, bottom). Exact locations were selected by the sampling team in order to meet the sample requirements of Table 4 in a safe manner. Samples were collected using Table 4, as follows:

- Sample numbers 1 – 9 were collected from the pile located in the north staging area on the RTL Complex.
- Sample numbers 10 – 14 were collected from the pile located in the south staging area on the RTL Complex.

Table 4. General locations on layback piles for random samples

Sample Number	Side of the Pile	Depth of the Pile
1	West side	Bottom
2	West side	Top
3	South side	Middle
4	North side	Bottom
5	South side	Top
6	West side	Middle
Duplicate	West side	Middle
7	East side	Top
8	South side	Bottom
9	North side	Top
10	East side	Bottom
11	North side	Middle
12	East side	Middle
13	West side	Middle
14	North side	Top

4.4.3 Data Quality Objectives

All of the DQOs for the RTL Complex, as stated in Snelling and Bunn (2018), apply to the layback sampling and analyses. The DQOs establish the type, quantity, and quality of data required to make statistically valid and resource-efficient decisions in support of the RTL Disposition Program.

4.4.4 Analysis of Layback Soil Samples

The layback sampling and analyses met the quality assurance project plan for the layback soil piles as stated for radionuclides in the FSS plan (Bunn et al. 2018). The analytical results for the

layback soil piles were evaluated using the same procedures and processes as the results for other RTL Complex survey units, as described in the DQO (Snelling and Bunn 2018) and the FSS plan (Bunn et al. 2018).

Figure 8 presents the reported values for each radionuclide on a lognormal scale to show the range of concentrations from layback samples. All COPC results were less than the action levels and release limits. Results confirmed assumptions that the layback piles do not contain COPCs above the release limits, action levels, or sum of fraction requirements for the disposition of the RTL Complex and can be used to backfill the excavated areas that meet the criteria for unrestricted use in accordance with the *Battelle Facilities Restoration Program Management Plan Volume I* and the *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition Program* (Smoter and Biebesheimer 2017; Biebesheimer 2018a). Additional discussion of results can be found in Appendix B.

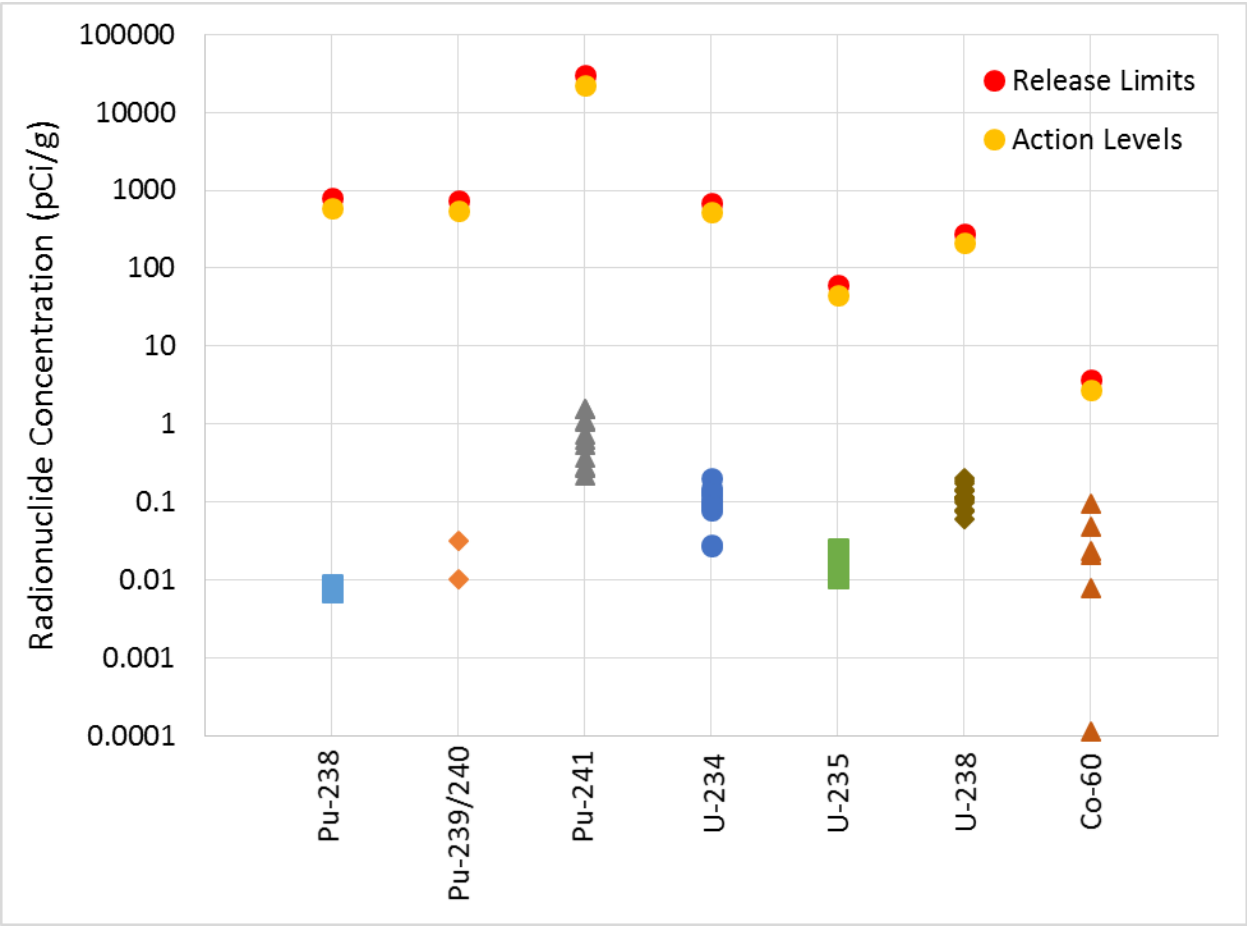

Figure 8. Lognormal plot indicating that radionuclide concentrations are below the action levels and release limits for the layback samples

5.0 Data Quality Assessment

Data quality assessment is an important part of the MARSSIM process. FSS data need to be both reliable and credible. This section describes the results of the quality control measures implemented during the FSS and deviations to the FSS plan (Bunn et al. 2018)

5.1 Data Quality Indicators

In addition to DQOs, data quality indicators (DQIs) that quantify the amount of error in the data collection process and the analytical measurement system are necessary to optimize survey design (NRC 2000). The principal DQIs are precision, accuracy, representativeness, comparability, completeness, and sensitivity. Of these DQIs, precision is a quantitative measure, accuracy is a combination of precision and bias, representativeness and comparability are qualitative, and completeness is a combination of both qualitative and quantitative measures (NRC 2000).

5.1.1 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. As specified in the FSS plan (Bunn et al. 2018), field duplicate samples were collected from one sample location each sampling day to provide information on the consistency of sampling activities. Additionally, laboratory duplicates were evaluated to provide information on laboratory reproducibility.

The required laboratory analytical precision was ≤30% for replicate sample relative percent differences (RPDs). Sample and duplicate results (field and laboratory) were reviewed. RPD was only calculated where results for a given COPC were greater than or equal to five times (5x) the minimum detectable concentration (MDC). This approach is based on similar guidance from the U.S. Environmental Protection Agency for inorganic data review from multiple analytical methods (EPA 2010). No COPC values were reported that exceeded 5x MDC, so no RPD evaluations were completed. Precision is summarized with other DQIs in Table 6.

5.1.2 Accuracy

Accuracy is a measure of the overall agreement of a measurement to a known value that includes a combination of random error (precision) and systematic error (bias) components of sampling and analytical operations. Accuracy is determined by analyzing a reference material of known contaminant concentration or by reanalyzing material to which a known concentration of contaminant has been added. To be accurate, data must be both precise and unbiased.

Laboratory accuracy determination is based on laboratory control sample (LCS) results and tracer recovery factors. The required laboratory analytical accuracy is 70% to 130% for batch LCS percent recoveries and tracer recovery factors. Exceptions were identified for three samples, but the results were not found to impact the overall quality of the data. The plutonium-242 tracer recovery factor for sample B3KFC9 in the 520 building footprint survey unit was above the upper acceptance limit. The plutonium-238 result was greater than the MDC and was flagged as an estimate. The plutonium-239/240 result for the same sample was less than the MDC. The LCS recovery for plutonium-239/240 for 4 of the 17 samples in the tank vault and 530 building footprint survey unit was above the acceptance limit, but associated sample results

were less than the MDC. The LCS recovery for plutonium-241 for 17 of the 21 samples in the other buildings footprint survey unit was above the upper acceptance limit, but associated sample results were less than the MDC. Accuracy is summarized with other DQIs in Table 6.

5.1.3 Representativeness

Representativeness is a qualitative term expressing “the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition” (ANSI/ASQ 1995). Representativeness is a qualitative attribute that is evaluated to determine whether measurements are made and collected in such a manner that the resulting data appropriately reflect the media and residual radioactivity measured.

The key to having representative samples is in the selection of sample locations. Because of the way that the survey units were defined, it was possible to assume that any area within a given survey unit had an equal probability of having residual radioactivity present. Random sample locations were chosen in accordance with guidance in MARSSIM.

All data generated in the RTL Complex were reviewed. The results showed that location coverage was consistent and supported the assumptions made in designing the surveys. As a measure of added conservativism, specific judgmental sampling was performed near areas with a higher potential for contamination based on information provided in the HSA (Lindenmeier et al. 2015; Biebesheimer 2018b). No issues were identified with the representativeness of sample locations. Representativeness is summarized with other DQIs in Table 6.

5.1.4 Comparability

Comparability is a qualitative term expressing the measure of confidence that one data set can be compared to another and can be combined for decision making. Use of the same sampling protocols for all samples and analysis completed by the same laboratories with the same methods for a given COPC provides confidence in the comparability of results. Comparability is summarized with other DQIs in Table 6.

5.1.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected. A percent completeness of 80% was stated as the required minimum for COPCs in the FSS plan. No issues were identified with the completeness of the data set, as each survey unit had 100% valid measurements for each COPC. Completeness is summarized with other DQIs in Table 6.

5.1.6 Sensitivity

Sensitivity is the capability of a method or instrument to discriminate among measurement responses representing different levels of the variable of interest. This indicator is measured by comparison of method detection limits to the required quantification limits (10% of the release limits).

No issues were identified in the sensitivity evaluation. The MDCs reported by the laboratory were lower than the required quantification limit (10% of release limits listed in Table 5) for each

COPC. Table 5 gives the minimum and maximum MDCs reported by the laboratory for each COPC. Sensitivity is summarized with other DQIs in Table 6.

Table 5. Actual quantification limits reported for radiological COPCs

	Release Limit (pCi/g)	Maximum Allowable MDC (pCi/g)	Minimum MDC Reported (pCi/g)	Maximum MDC Reported (pCi/g)
Plutonium-238	800	80	0.0344	0.146
Plutonium-239/240	740	74	0.0245	0.125
Plutonium-241	30,000	3,000	1.36	6.34
Uranium-234	700	70	0.0286	0.177
Uranium-235	60	6	0.0286	0.192
Uranium-238	280	28	0.0286	0.325
Cobalt-60	3.7	0.37	0.062	0.122

Table 6. Summary of evaluation of data quality indicators by RTL Complex survey unit

Data Quality Indicator	Evaluation Summary
Precision	Acceptable: Reported concentrations for primary and/or duplicate sample were <5x MDC, so no RPD calculated.
Accuracy	Acceptable: All LCS recoveries and carrier/tracer recovery factors were acceptable with exceptions for the 520 building,[(a)] tank vault and 530 building,[(b)] and other buildings'[(c)] survey units. Exceptions were not found to be quality affecting.
Representativeness	Acceptable: Samples were taken as outlined in the sampling and analysis plan, including random and judgmental samples.
Comparability	Acceptable: The same protocols were used to collect all samples. One laboratory completed the analysis for samples throughout all survey units using a single method for a given COPC.
Completeness	Acceptable: Completeness was calculated to be 100% for all COPCs in each survey unit.
Sensitivity	Acceptable: Minimum detection limits are less than the required quantification limit (10% of release limits) for each COPC in all survey units.

(a) The plutonium-242 tracer recovery factor for sample B3KFC9 at the 520-12 location was above the upper acceptance limit. The plutonium-238 sample result was greater than the MDC and was flagged as an estimate. The plutonium-239/240 result was less than the MDC and needed no additional flags.
(b) The LCS recovery for plutonium-239/240 was above the acceptance limit, but associated sample results for 4 locations were less than the MDC.
(c) The LCS recovery for plutonium-241 was above the upper acceptance limit, but associated sample results for 17 locations were less than the MDC.

5.2 Deviations from the Final Status Survey Plan

5.2.1 Removal of Sample Location J-32

A decision was made to remove sample J-32 from the list of samples identified in the FSS plan (Bunn et al. 2018). The J-32 sample location was a specific judgmental sample located at the sewer isolation point at the connection with the City of Richland municipal line along Innovation Blvd. It was recognized during the removal of the main east-west sewer line that removal of the sewer line to this sample location would be problematic with respect to its proximity to Innovation Blvd. There was another specific judgmental location (J-31) along the sewer line just east of the J-32 location that was collected. The J-31 location was at the access point for industrial wastewater discharge sampling for the City of Richland Industrial Wastewater Discharge Permit CR-IU001 Outfall 003. A decision was made to terminate sewer line removal activities at judgmental sample J-31. The sewer line was plugged with grout at this termination point and the sewer line between the two sample locations remains intact.

To support the decision to terminate sewer line removal activities, an in-process sample was collected at this location. Soil was collected as near as possible to the grout plug using a back-hoe bucket, and the in-process sample was collected from the bucket. The sample was analyzed for all radiological analytes specified in the FSS plan (Bunn et al. 2018). The sample numbers were B3J5X2, B3J5X3, and B3J5X4. All results were below the release limits identified in the FSS plan (Bunn et al. 2018).

Upon review of the analytical results, a layer of straw was placed in the trench created by the excavation of the sewer line to demarcate the excavation depth prior to backfill of the trench for safety and operational purposes. The trench was re-excavated to expose at-depth sample locations where the sewer line was removed for the FSS sampling event.

The removal of sample J-32 does not impact the quality and/or quantity of data used to make decisions on the release of the RTL Complex. The statistical evaluation of the random samples within the pipelines survey unit is not affected by the removal of the judgmental sample at location J-32. Any concern of COPCs along the sewer line would be identified through the analysis of samples from the J-31 location due east of the J-32 location.

5.2.2 Methods Report Multiple Radionuclides

TestAmerica, Inc., in Richland, WA, used alpha spectroscopy to evaluate concentrations of uranium-234 and uranium-235 in the samples taken from the RTL Complex. Results were reported as uranium-233/234 and uranium-235/236, giving concentrations as combined totals of the isotope pairs. Most of the uranium-233 and uranium-236 isotopes are at trace levels in comparison to the uranium-234 and uranium-235 isotopes. Given that the results are reported as a combination of two isotopes, the results could be biased high for individual uranium-234 and uranium-235 values. Across the RTL Complex, the highest reported value for uranium-233/234 is 0.451 pCi/g, which is approximately three orders of magnitude below the uranium-234 release limit of 700 pCi/g. The highest value reported for uranium-235/236 across the RTL Complex is 0.0522 pCi/g, which is also over three orders of magnitude below the uranium-235 release limit of 60 pCi/g. Any measurement uncertainty associated with reporting of the combined isotopes will not impact the quality of data used for decision making because all reported values are three orders of magnitude below the release limits.

5.3 Summary of Data Quality Assessment Results

The data obtained as part of the FSS are of acceptable quality for use in making decisions regarding the release of the RTL Complex. This determination that the results are usable is based on the analysis described in this section and those presented in Section 6.0.

6.0 Survey Results

The sampling campaign for the FSS of the RTL Complex was conducted over the course of 12 days between November 11 and December 7, 2018, collecting soil samples from 127 locations across the six survey units. Samples were analyzed using the technologies described in Section 4.3. Laboratory results were independently validated (Level C) by Analytical Quality Associates prior to evaluation.

Table 7 summarizes the results indicating that measured concentrations for all radiological COPCs were below the action levels and the release limits for all samples within the six survey units. Sum of fractions calculated for each of the survey units using maximum values are shown in Table 7. All values were approximately 3% of unity or less indicating that the sum of fractions requirement was also met for each survey unit.

Results for each radiological COPC from both random and specific judgmental locations were plotted by survey unit to illustrate the range of concentrations observed relative to the release limits and action levels. A lognormal axis was used to show the range of concentrations that were orders of magnitude (10 to 1000 times) lower than the release limits and action levels. Due to the use of the lognormal scale, only the positive non-zero values are presented in Figure 9 through Figure 15. These figures indicate that the reported concentrations are orders of magnitude below the release limits and similar concentrations are observed across each of the survey units.

Field and laboratory precision and bias results provided no evidence that measurement precision and bias uncertainty would impact evaluation of results compared to the release limits. Appendix C contains figures with the individual measurements plotted spatially by survey unit. Appendix D contains the analysis reports from the laboratory. Data validation reports from Analytical Quality Associated, Inc. are found by survey unit in Appendix E.

Table 7. Summary of sample results from the RTL Complex final status survey

COPC	Release Limit (pCi/g)	Action Level (pCi/g)		520 Building Footprint	Pipeline	Tank Vault & 530 Building Footprint	Other Buildings Footprint	Open Areas	Paved Areas
Pu-238	800	600	Detects	12	0	0	0	0	0
			Non-Detects	16	23	17	21	15	23
			Minimum	-0.012	-0.009	-0.009	-0.014	-0.010	-0.012
			Mean	0.062	-0.002	0.002	-0.003	0.002	-0.001
			Median	0.028	-0.004	-0.001	-0.004	-0.002	-0.003
			Maximum	0.238	0.010	0.023	0.008	0.034	0.013
			Standard Deviation	0.073	0.007	0.010	0.005	0.013	0.007
Pu-239/240	740	555	Detects	0	0	0	0	0	0
			Non-Detects	28	23	17	21	15	23
			Minimum	-0.009	-0.010	-0.012	-0.005	-0.003	-0.011
			Mean	0.000	0.001	-0.002	0.001	0.001	0.001
			Median	-0.001	-0.001	-0.002	-0.001	-0.001	-0.001
			Maximum	0.012	0.031	0.015	0.025	0.013	0.016
			Standard Deviation	0.005	0.008	0.007	0.007	0.006	0.007
Pu-241	30000	22500	Detects	0	0	0	0	0	0
			Non-Detects	28	23	17	21	15	23
			Minimum	-2.400	-1.000	-1.500	-0.760	-0.930	-0.570
			Mean	-0.389	-0.026	-0.487	0.314	0.149	0.618
			Median	-0.200	-0.160	-0.540	0.238	0.248	0.384
			Maximum	1.440	1.810	1.430	1.660	1.210	4.050
			Standard Deviation	1.096	0.763	0.749	0.726	0.630	1.028
U-234 [(a)]	700	525	Detects	24	18	15	17	13	20
			Non-Detects	4	5	2	4	2	3
			Minimum	0.016	0.023	0.042	0.046	0.024	0.032
			Mean	0.121	0.107	0.129	0.117	0.213	0.106
			Median	0.106	0.108	0.116	0.108	0.181	0.101
			Maximum	0.274	0.226	0.251	0.214	0.451	0.196
			Standard Deviation	0.062	0.058	0.054	0.051	0.131	0.040

COPC	Release Limit (pCi/g)	Action Level (pCi/g)		520 Building Footprint	Pipeline	Tank Vault & 530 Building Footprint	Other Buildings Footprint	Open Areas	Paved Areas
U-235 [(b)]	60	45	Detects	0	1	0	0	1	0
			Non-Detects	28	22	17	21	14	23
			Minimum	-0.013	-0.004	-0.006	-0.003	-0.003	-0.002
			Mean	0.005	0.010	0.002	0.003	0.008	0.006
			Median	0.000	0.012	0.000	-0.001	0.008	0.000
			Maximum	0.043	0.046	0.018	0.018	0.052	0.022
			Standard Deviation	0.011	0.013	0.007	0.007	0.014	0.007
U-238	280	210	Detects	26	19	11	19	13	19
			Non-Detects	2	4	6	2	2	4
			Minimum	0.020	0.034	0.012	0.055	0.024	0.012
			Mean	0.132	0.104	0.113	0.117	0.192	0.110
			Median	0.130	0.094	0.099	0.107	0.156	0.104
			Maximum	0.306	0.217	0.259	0.278	0.337	0.200
			Standard Deviation	0.054	0.046	0.062	0.053	0.103	0.048
Co-60	3.7	2.8	Detects	0	0	0	0	0	0
			Non-Detects	28	23	17	21	15	23
			Minimum	-0.110	-0.060	-0.120	-0.150	-0.140	-0.150
			Mean	-0.009	0.009	-0.016	0.011	-0.004	0.003
			Median	0.002	0.008	-0.017	0.019	0.007	0.013
			Maximum	0.079	0.071	0.066	0.109	0.072	0.074
			Standard Deviation	0.049	0.031	0.046	0.061	0.059	0.051
Sum of Fractions (using maximum values)				0.0240	0.0212	0.0195	0.0311	0.0223	0.0216

(a) Uranium-234 concentrations reported by the laboratory as uranium-233/234.
(b) Uranium-235 concentrations reported by the laboratory as uranium-235/236.

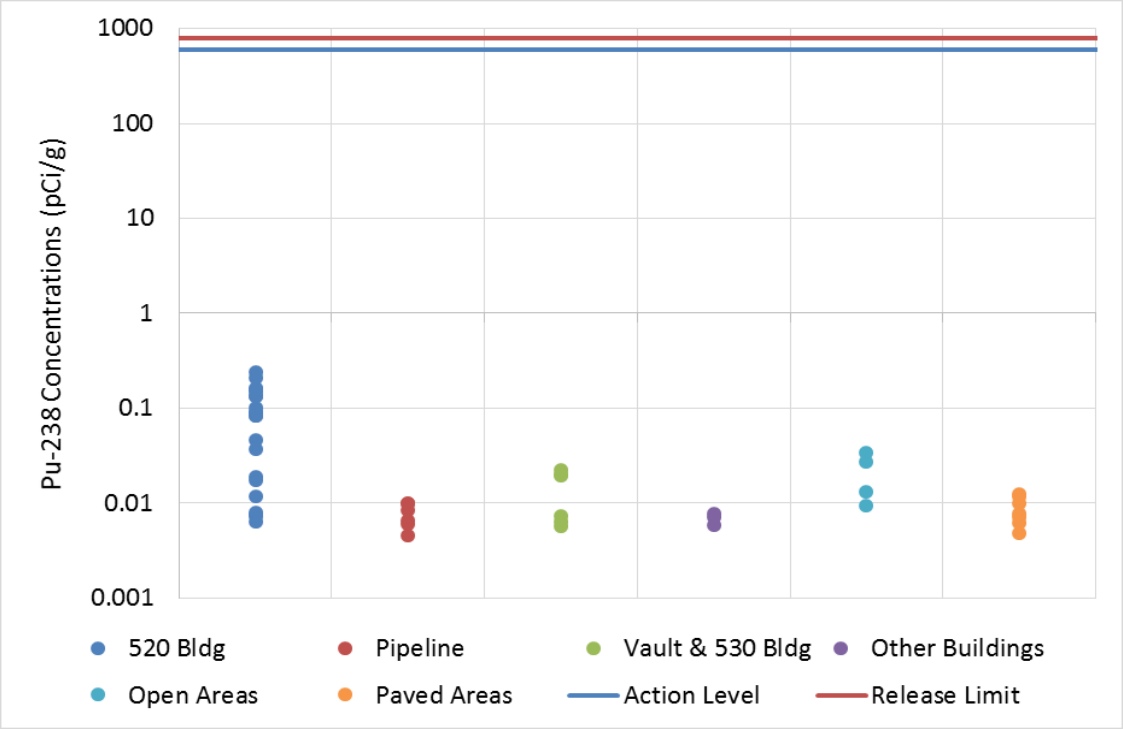

Figure 9. Lognormal plot of plutonium-238 concentrations by survey unit shown in relation to the action level (600 pCi/g) and release limit (800 pCi/g)

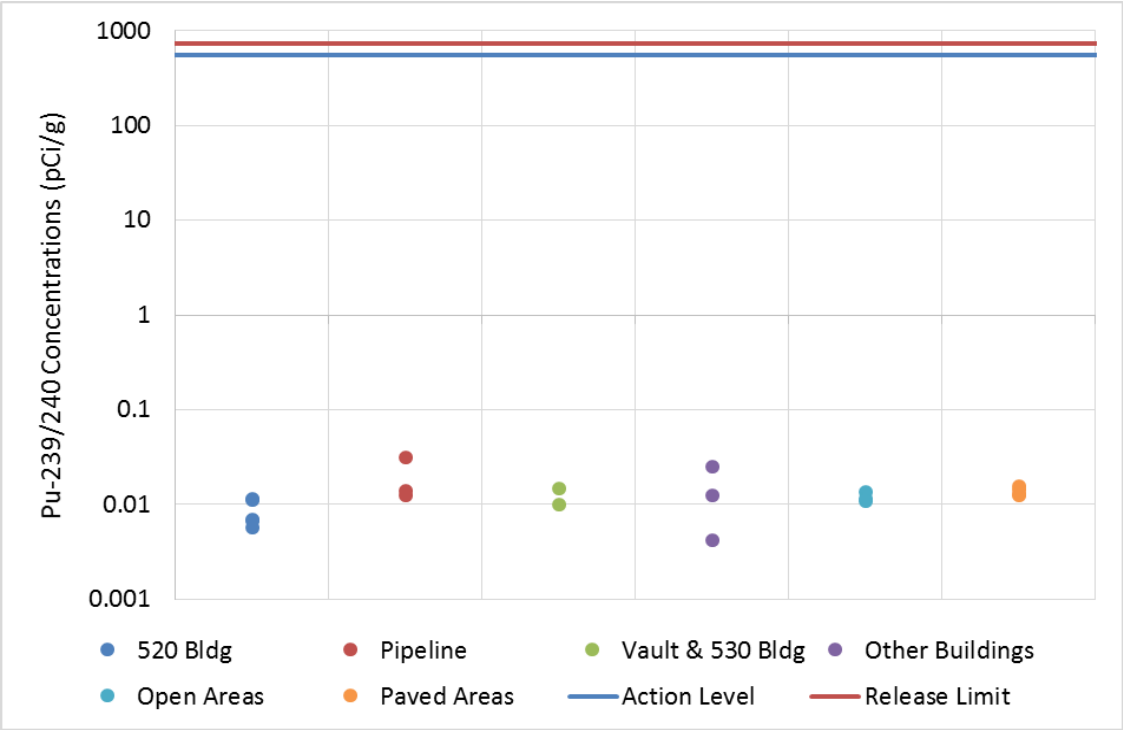

Figure 10. Lognormal plot of plutonium-239/240 concentrations by survey unit shown in relation to the action level (555 pCi/g) and release limit (740 pCi/g)

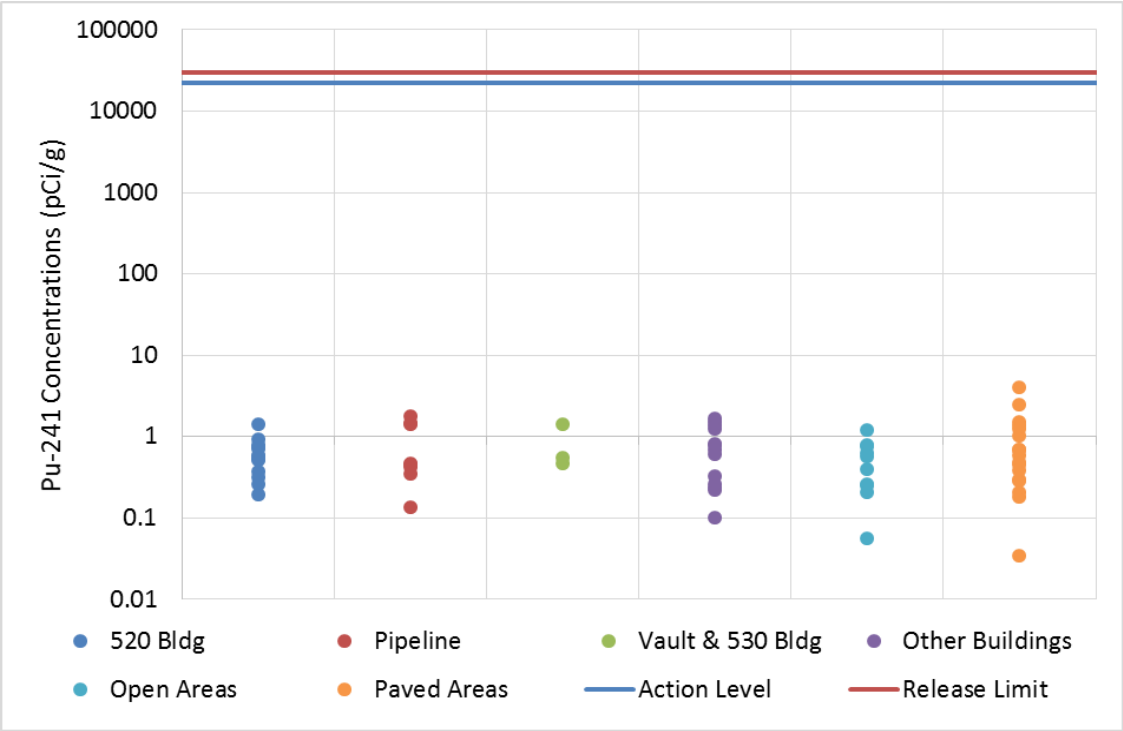

Figure 11. Lognormal plot of plutonium-241 concentrations by survey unit shown in relation to the action level (22,500 pCi/g) and release limit (30,000 pCi/g)

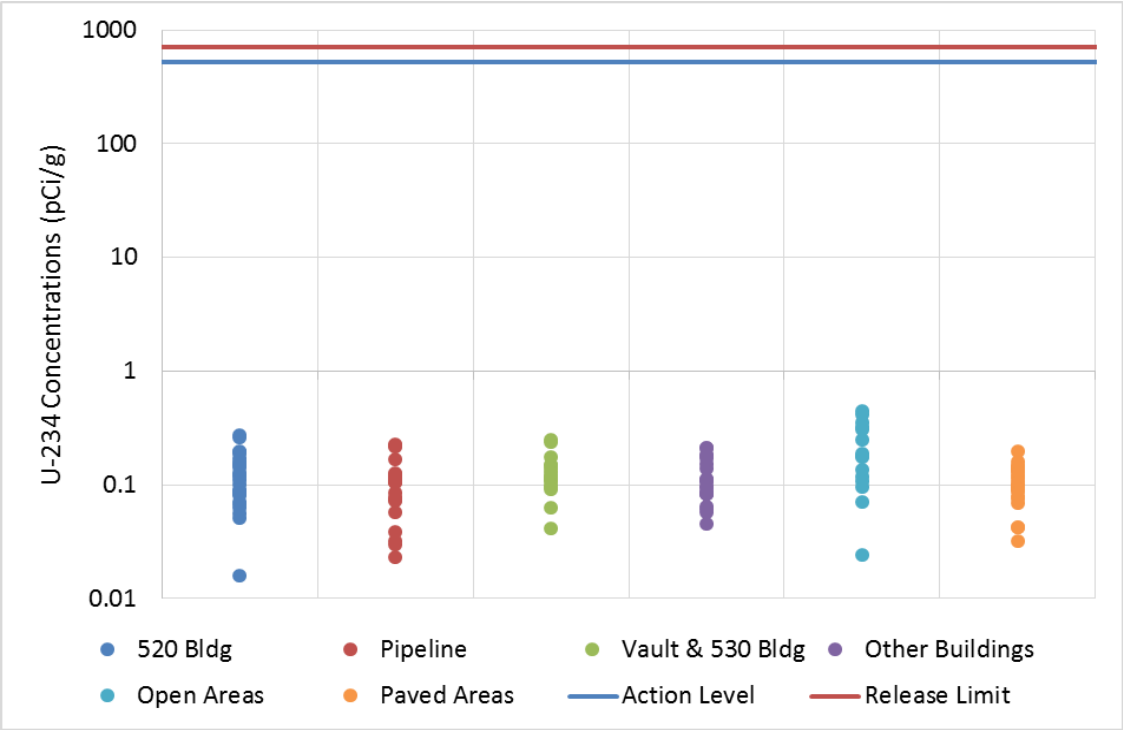

Figure 12. Lognormal plot of uranium-234 concentrations (reported as uranium-233/234) by survey unit shown in relation to the action level (525 pCi/g) and release limit (700 pCi/g)

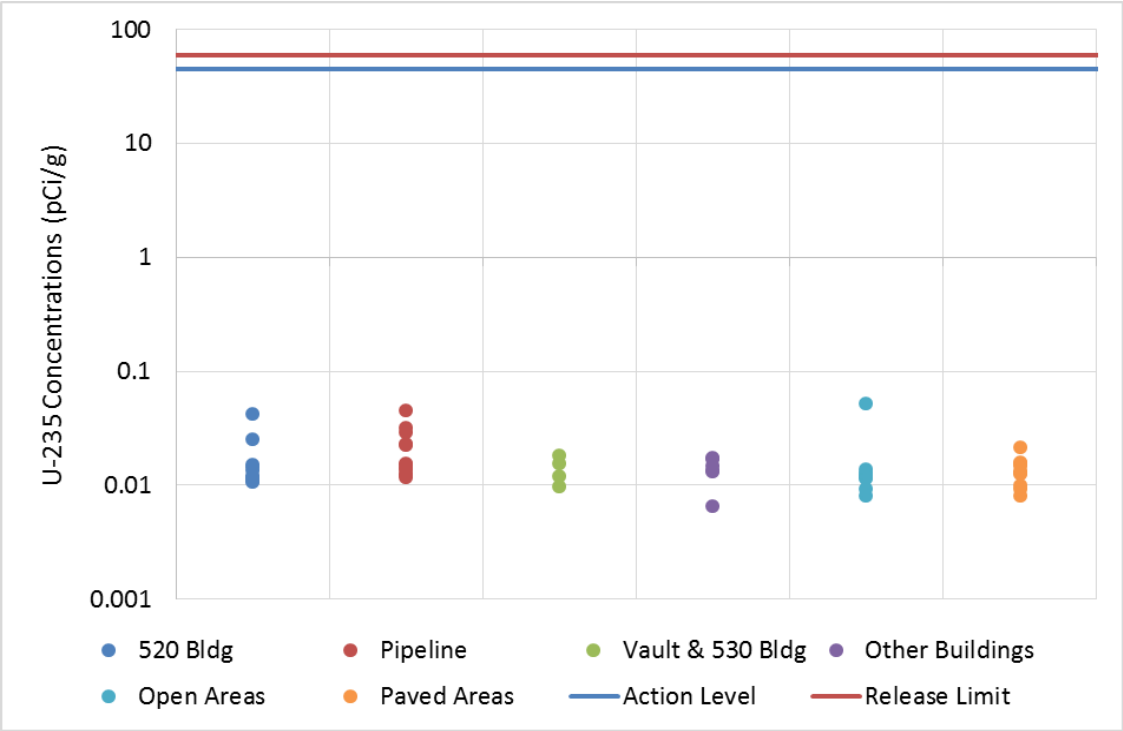

Figure 13. Lognormal plot of uranium-235 (reported as uranium-235/236) concentrations by survey unit shown in relation to the action level (45 pCi/g) and release limit (60 pCi/g)

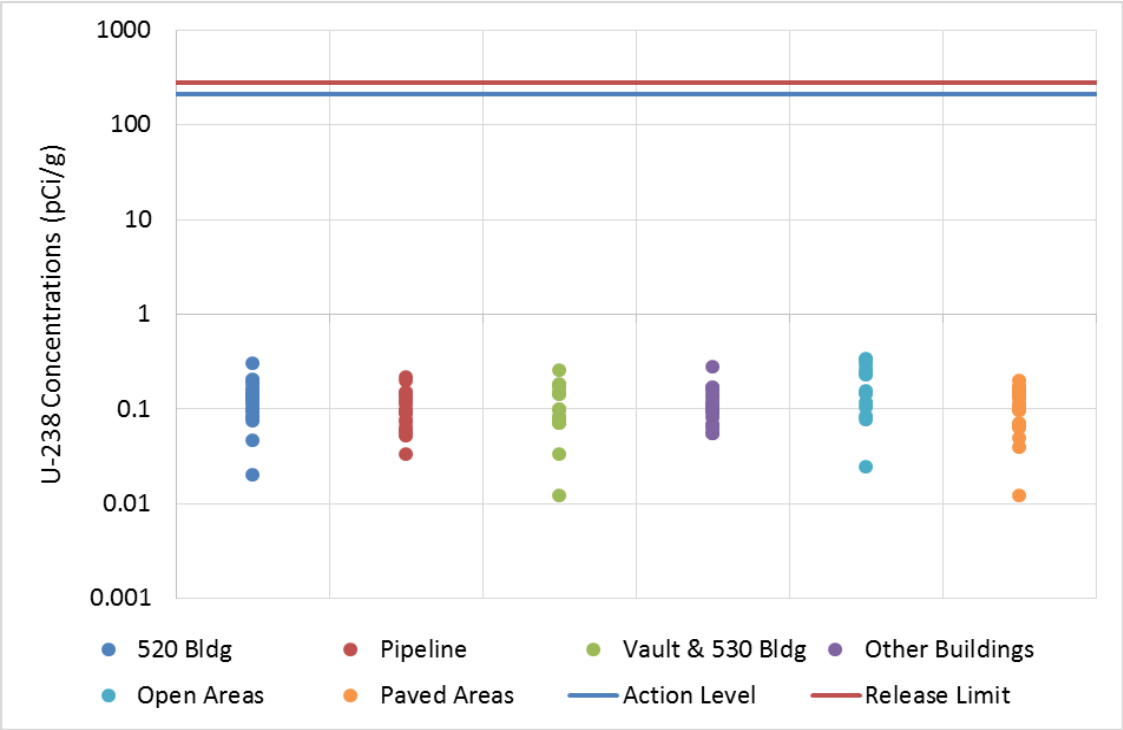

Figure 14. Lognormal plot of uranium-238 concentrations by survey unit shown in relation to the action level (210 pCi/g) and release limit (280 pCi/g)

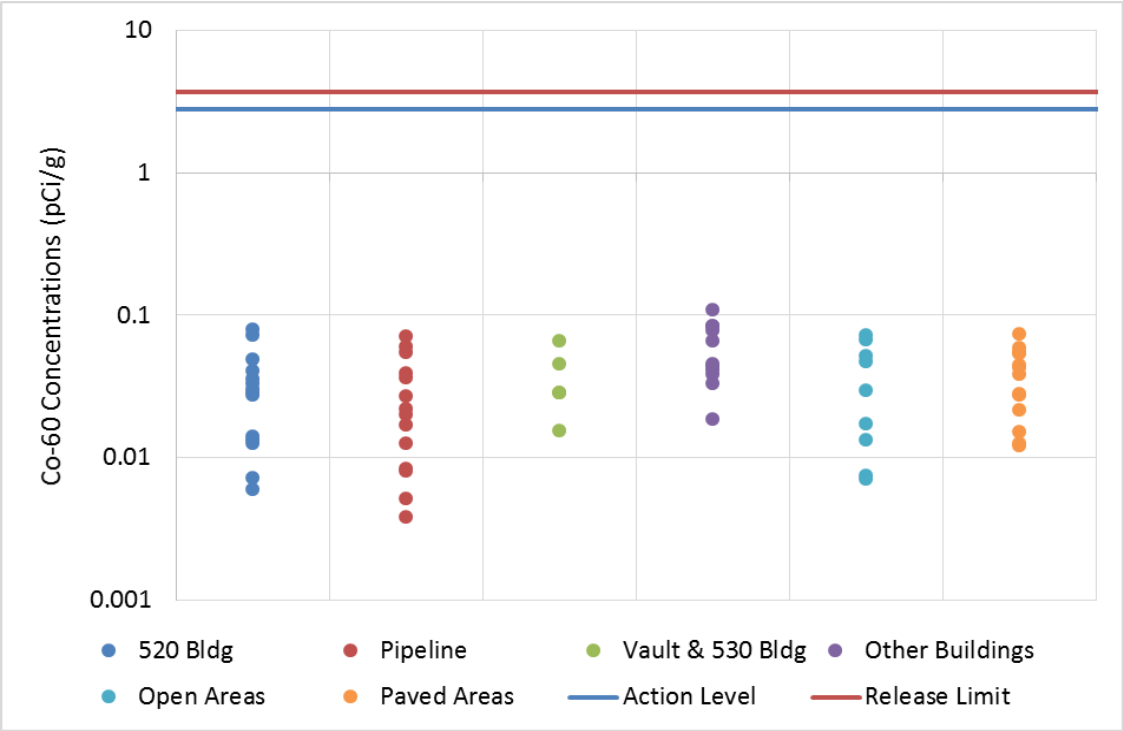

Figure 15. Lognormal plot of cobalt-60 concentrations by survey unit shown in relation to the action level (2.8 pCi/g) and release limit (3.7 pCi/g)

6.1 Final Status Survey Conclusions

All of the residual radioactivity measurements (>880 results) were less than the release limits and action levels established through the RTL Disposition Program. The FSS plan (Bunn et al. 2018) identified the Sign test as a statistical approach defined within MARSSIM to demonstrate compliance with the release criterion when the COPC of interest is not present in background or is present in such a small fraction of the DCGL (or release limit) as to be considered insignificant (NRC 2000). MARSSIM also states that if the largest measurement is below the DCGL, the Sign test will always show that the survey unit meets the release criterion. As shown in Table 7, the maximum values obtained for each COPC were orders of magnitude below the release limits across all six survey units meeting release criterion for the Sign test. The application of the sum of fractions using the maximum value reported for each radionuclide within a survey unit resulted in values ~3% or less of unity, indicated in Table 8 by a *Pass* designation. Therefore, the null hypothesis is rejected and the RTL Complex is recommended for release to unrestricted use in accordance with the clearance requirements of DOE Order 458.1.

Table 8. Summary of RTL Complex final status survey results

Survey Unit	MARSSIM Class	Number Locations Sampled	Number of Results Less than Action Level[(a)]	Pass/Fail
520 Building Footprint	3	28	196	Pass
Tank Vault and 530 Building Footprint	3	17	119	Pass
Other Buildings Footprint	3	21	147	Pass
Pipelines	3	23	161	Pass
Paved Areas	3	23	161	Pass
Open Areas	3	15	105	Pass
Total	-	127	889	-

(a) All radiological COPCs are measured at each sampled location, providing seven results for one location.

7.0 References

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Appendix A – Survey Sample Locations

A.1 Sample Locations per Survey Unit as Generated in VSP

The Research Technology Laboratory (RTL) Complex survey units are considered Class 3 under the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM; NRC 2000); therefore, simple random sampling was used to generate 14 random sample locations within each survey unit using the Visual Sample Plan (VSP) software. The following sections present the sampling locations for random sample locations and specific judgmental sample locations within each survey unit.

Random sample locations and specific judgmental sample locations are presented as easting (X)/northing (Y) in North American Datum (NAD) 1983 Washington State Plane South (4602) in feet (EPSG 2286). Table A.1 presents the descriptions and coordinates of the 44 specific judgmental samples. No field judgmental samples were selected. Figure A.1 presents a summary of all random and specific judgmental sample locations for the RTL Complex.

Table A.1. Specific judgmental sample descriptions and coordinates

Sample No.	Description	Survey Unit	Easting (X), Northing (Y) [(a)]
J-1	RTL 520: Soil below slab of Laser Dye Processing Lab 248 (Exxon era), where large dye stains exist on concrete underneath sheet flooring that was removed.	RTL 520	1950236.5863, 368388.1079
J-2	RTL 520: Soil below slab of Laser Dye Processing Lab 448 (Exxon era), where large dye stains exist on concrete underneath sheet flooring that was removed.	RTL 520	1950236.9335, 368333.1600
J-3	RTL 520: East service corridor, located east of three FCAs in corridor.	RTL 520	1950196.3461, 368361.7787
J-4	RTL 520: East service corridor, located between three FCAs in corridor.	RTL 520	1950164.8318, 368362.0585
J-5	RTL 520: Soil below slab of Uranium Processing Lab 228 (Exxon era), where documented process upsets occurred and where PNNL documented the highest FCAs (1–6 million dpm/100 cm^2) on concrete underneath sheet flooring that was removed.	RTL 520	1950157.9923, 368388.5747
J-6	RTL 520: Soil below slab of Uranium Processing Lab 228 (Exxon era), where documented process upsets occurred and where PNNL documented the highest FCAs (1–6 million dpm/100 cm^2) on concrete underneath sheet flooring that was removed.	RTL 520	1950157.9302, 368379.5159
J-7	RTL 520: East service corridor, located west of three FCAs in corridor.	RTL 520	1950143.7070, 368361.6906
J-8	RTL 520: Soil below slab of Lab 218, where PNNL documented the second highest FCAs (1–2 million dpm/100 cm^2) on concrete underneath sheet flooring that was removed.	RTL 520	1950129.3329, 368379.0126

Sample No.	Description	Survey Unit	Easting (X), Northing (Y) [(a)]
J-9	RTL 520: Soil below slab of Lab 218, where PNNL documented the second highest FCAs (1–2 million dpm/100 cm^2) on concrete underneath sheet flooring that was removed.	RTL 520	1950108.6267, 368386.3803
J-10	6-foot-deep steel sewage sump in basement of RTL 520.	RTL 520	1950093.1940, 368356.1770
J-11	Condensate return unit in basement of RTL.	RTL 520	1950069.7560, 368368.9430
J-12	4-foot-deep steel sewage sump in basement of RTL. Note that while the sample appears to be outside of the RTL 520 building footprint, it falls within the footprint of the RTL 520 basement.	RTL 520	1950028.8250, 368436.2630
J-13	Align sample location along pipeline at mid-point between drains in Laboratory 132 and junction with foundation of RTL 520.	RTL 520	1949958.1960, 368400.3308
J-14	Align location to sample region where drains were located inside Laboratory 132.	RTL 520	1949960.4182, 368388.0231
J-15	Soil below northeast corner of radiological waste tank vault. This area is not covered by the randomly selected sample points for this survey unit.	RTL Tank Vault and 530	1949876.1409, 368445.4311
J-16	Soil below southwest corner of radiological waste tank vault. This area is not well covered by the randomly selected sample points.	RTL Tank Vault and 530	1949867.3543, 368437.7122
J-17	RTL 530: Small pit in the northeast corner of RTL 530 used as shielded storage of radioactive sources by Donald Douglas/Exxon prior to Battelle ownership. Battelle also used this area to store sources.	RTL Tank Vault and 530	1949874.5934, 368413.8384
J-18	RTL 510: Soil below slab in southwest corner of east room (solvent storage building – Exxon era) to provide more robust coverage beyond the random sample point already established in northeast corner.	Other Buildings	1950310.0238, 368393.4899
J-19	RTL 510: Soil below “pit” in southwest corner of west room.	Other Buildings	1950296.2217, 368394.9656
J-20	Sampling location for RTL 524.	Other Buildings	1949961.5963, 368485.1348
J-21	Additional sampling location for RTL 560.	Other Buildings	1949797.2575, 368375.3586
J-22	RTL 570: Soil below ventilation exhauster concrete pad footprint.	Other Buildings	1949743.5298, 368449.4808
J-23	RTL 570: Soil below pit, location below injection point of two French drains. Note, only physical evidence of southeast drain is apparent in pit. Sample point should be located approximately 18 in. northwest of southeast pit location.	Other Buildings	1949739.3641, 368427.6913
J-24	RTL 590: Soil below slab, west third of building. Under 90-day hazardous waste accumulation area. Located midway between existing randomly selected sample location and west wall.	Other Buildings	1949546.2651, 368228.2555

Sample No.	Description	Survey Unit	Easting (X), Northing (Y) [a]
J-25	Pipeline junction with RTL 520.	Pipeline Survey Unit	1950033.2369, 368417.7360
J-26	Pipeline junction with RTL 520 and Laboratory 132.	Pipeline Survey Unit	1949956.2418, 368413.7748
J-27	Pipeline junction with RTL tank vault.	Pipeline Survey Unit	1949877.2660, 368436.1802
J-28	Pipeline junction with RTL 530.	Pipeline Survey Unit	1949862.6350, 368397.7417
J-29	Multiple pipeline union.	Pipeline Survey Unit	1949736.1473, 368405.5786
J-30	Sewer drain from RTL 580.	Pipeline Survey Unit	1949716.2560, 368220.5096
J-31	Location of access point for industrial wastewater discharge sampling for the City of Richland Industrial Wastewater Discharge Permit CR-IU001 Outfall 003.	Pipeline Survey Unit	1949576.3076, 368443.4969
J-32	Soil below sewer isolation point at connection with City of Richland municipal line along Innovation Blvd. *Sample was not collected. See Section 5.2.1 for discussion.*	Pipeline Survey Unit	1949480.6835, 368442.9691
J-43	Soil at the same depth of the RTL tank vault (6 to 8 ft below grade) near the junction of the removed waste transfer pipeline with the RTL tank vault, which was removed in 1998 (Biebesheimer et al. 2016, Section 4.5.3; McCoy 1999).	Pipeline Survey Unit	1949908.8670, 368440.1503
J-44	Soil at the same depth of the RTL tank vault (6 to 8 ft below grade) along the removed waste transfer pipeline between RTL tank vault and RTL 520 building, which was removed in 1998 (Biebesheimer et al. 2016, Section 4.5.3; McCoy 1999).	Pipeline Survey Unit	1949957.3739, 368431.7475
J-33	Gravel area in southeast corner of RTL 520 associated with historical Exxon tank (Biebesheimer 2017). Note, this is a subsurface sample.	Paved Areas	1950300.7070, 368313.6670
J-34	Gravel area in southeast corner of RTL 520 associated with historical Exxon tank (Biebesheimer 2017). Note, this is a subsurface sample.	Paved Areas	1950297.7070, 368313.6670
J-35	Gravel area in southeast corner of RTL 520 associated with historical Exxon tank (Biebesheimer 2017). Note, this is a subsurface sample.	Paved Areas	1950293.7070, 368313.6670
J-36	Northeast loading dock for RTL 520.	Paved Areas	1950268.3621, 368398.1147
J-37	Soil below discharge/injection point for UIC RTL-02. (Biebesheimer et al. 2016.).	Paved Areas	1950050.3790, 368169.1470
J-38	Northwest loading dock for RTL 520.	Paved Areas	1949881.2957, 368392.1820
J-39	Catch basin 2 connected to UIC RTL-03 (sample J-41) (Biebesheimer et al. 2016).	Paved Areas	1949766.4159, 368293.8199
J-40	Catch basin 1 connected to UIC RTL-03 (sample J-41) (Biebesheimer et al. 2016).	Paved Areas	1949708.0444, 368295.3765

Sample No.	Description	Survey Unit	Easting (X), Northing (Y) [(a)]
J-41	Soil below discharge/injection point for UIC RTL-03 (Biebesheimer et al. 2016).	Paved Areas	1949651.9787, 368296.7477
J-42	Soil below discharge/injection point for UIC RTL-01 (Biebesheimer et al. 2016).	Open Areas	1950297.3909, 368417.2828

FCA = fixed contamination area; Other Buildings = RTL 510, 524, 540, 550, 560, and 590 buildings; PNNL = Pacific Northwest National Laboratory; UIC = underground injection control.
(a) Presented as easting (X)/northing (Y) in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

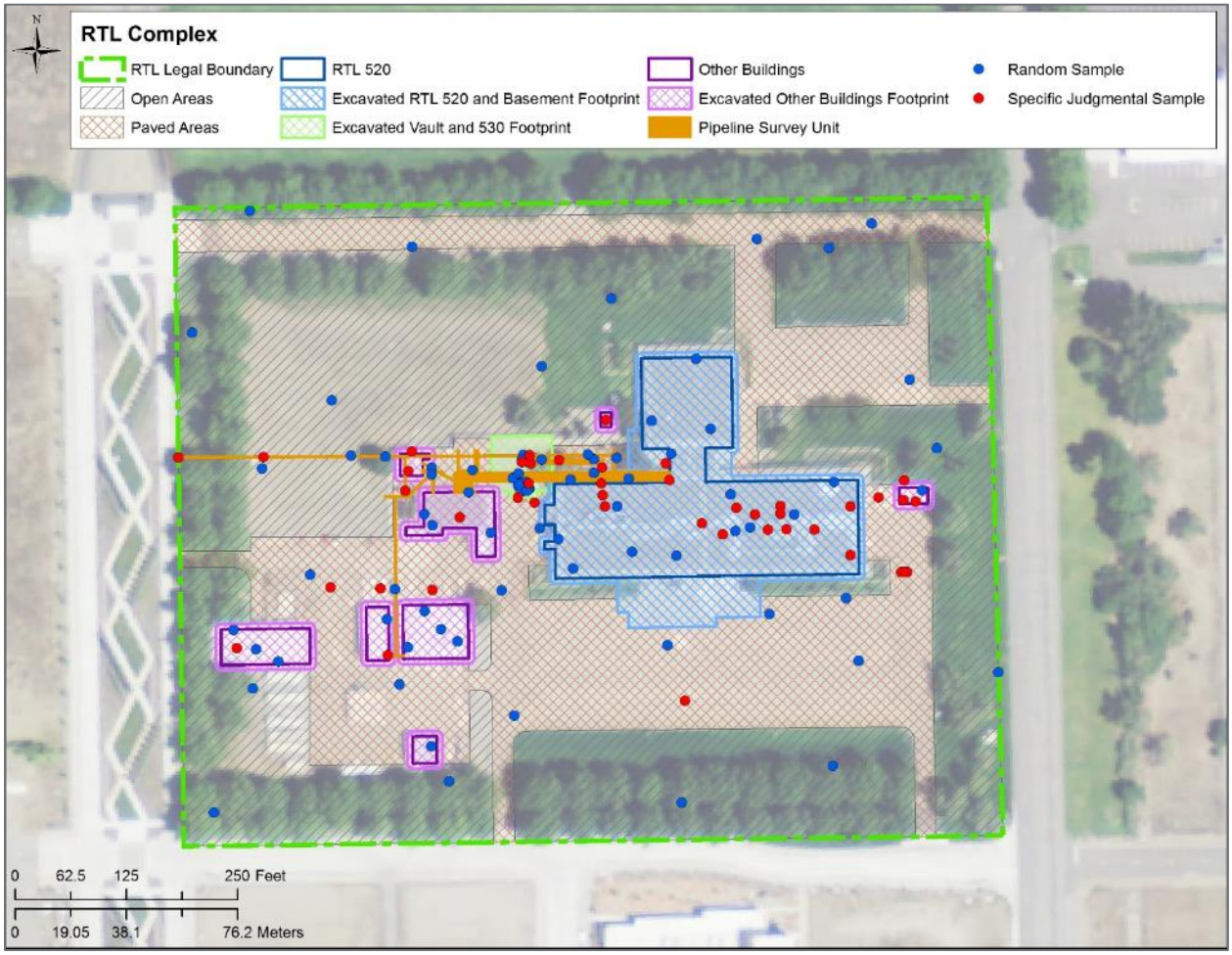

Figure A.1. Summary of all random and specific judgmental samples for the RTL Complex

A.2 RTL 520 Building Footprint

Table A.2 presents the 14 random sample locations for the RTL 520 building footprint (520) survey unit. Figure A.2 and Figure A.3 show the locations of the random samples and the specific judgmental samples.

Table A.2. Random sample locations for the RTL 520 building footprint survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
520-1	1949907.9353	368350.9599	520-8	1950079.5028	368475.0072
520-2	1950173.5882	368378.6399	520-9	1949990.9518	368336.6074
520-3	1950040.7618	368332.5066	520-10	1950123.7783	368364.2873
520-4	1950217.8637	368415.5465	520-11	1950035.2273	368447.3272
520-5	1950107.1750	368360.1866	520-12	1949924.5386	368318.1540
520-6	1949974.3485	368387.8666	520-13	1950101.6406	368401.1940
520-7	1950062.8995	368553.9464	520-14	1950013.0896	368484.2339

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

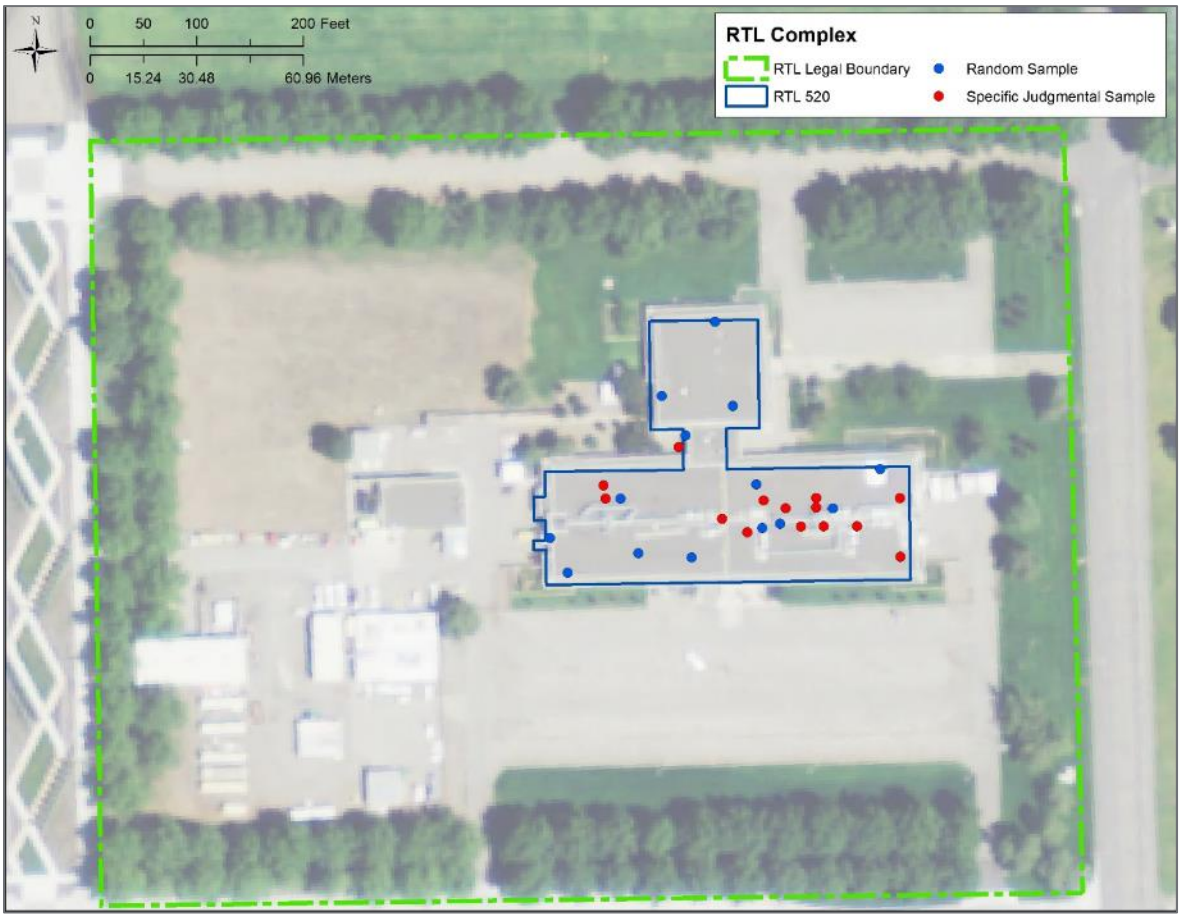

Figure A.2. RTL 520 footprint with random and specific judgmental sample locations

Figure A.3. RTL 520 footprint with random and specific judgmental sample locations (zoomed in)

A.3 RTL Tank Vault and RTL 530 Building Footprints

Table A.3 presents the 14 random sample locations for the RTL tank vault and RTL 530 building footprints (vault) survey unit. Figure A.4 shows RTL tank vault and RTL 530 building footprint within the complex. Figure A.5 is a close-up of the survey unit, showing the locations of the random samples and the specific judgmental samples.

Table A.3. Random sample locations for the RTL tank vault and RTL 530 building footprints survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
Vault-1	1949871.5252	368410.2322	Vault-8	1949864.4490	368412.1825
Vault-2	1949867.4817	368414.2828	Vault-9	1949872.5361	368405.4316
Vault-3	1949875.5688	368407.5319	Vault-10	1949871.6443	368441.2240
Vault-4	1949862.4273	368411.5824	Vault-11	1949871.7154	368442.3547
Vault-5	1949870.5144	368415.6329	Vault-12	1949868.6789	368445.7467
Vault-6	1949866.4708	368404.0814	Vault-13	1949874.7520	368437.0782
Vault-7	1949874.5579	368408.1319	Vault-14	1949867.1606	368440.4702

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

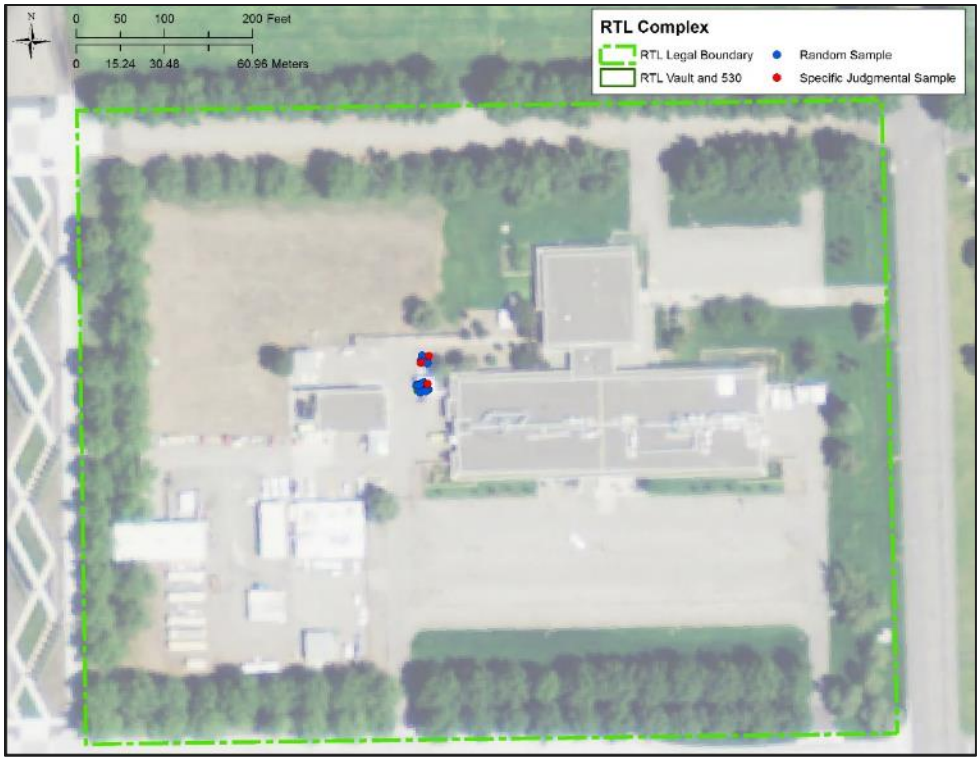

Figure A.4. The RTL Complex, showing the RTL tank vault and 530 footprint with random and specific judgmental sample locations

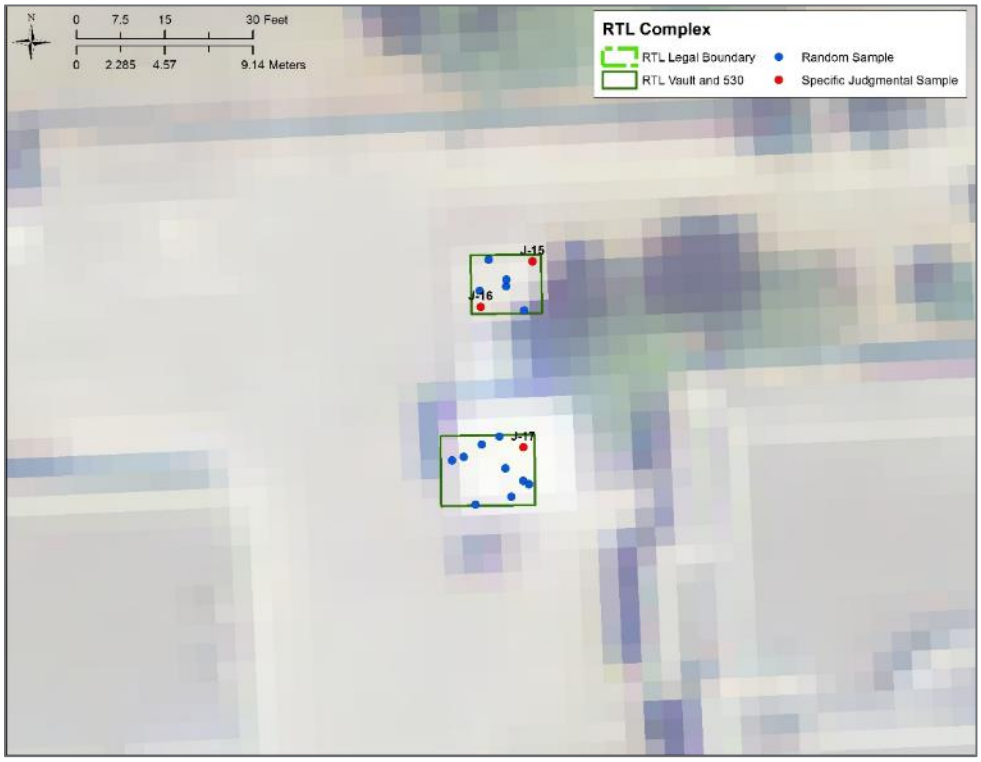

Figure A.5. RTL tank vault and 530 footprint with random and specific judgmental sample locations

A.4 RTL 510, 524, 540, 550, 560, 570, 580, and 590 Building Footprints

Table A.4 presents the 14 random sample locations for the RTL 510, 524, 540, 550, 560, 570, 580, and 590 building footprints (OB) survey unit. Figure A.6 shows the locations of the random samples and the specific judgmental samples.

Table A.4. Random sample locations for RTL 510, 524, 540, 550, 560, 570, 580, and 590 survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
OB-1	1949765.0400	368117.9036	OB-8	1949757.4508	368270.1985
OB-2	1949542.7348	368248.8214	OB-9	1949794.6441	368235.9419
OB-3	1949593.0247	368213.4933	OB-10	1949757.0279	368379.2574
OB-4	1949567.8798	368227.3174	OB-11	1949807.2775	368403.6350
OB-5	1949714.9347	368260.9722	OB-12	1949832.4022	368358.4913
OB-6	1949738.8542	368229.0905	OB-13	1949766.4497	368366.6172
OB-7	1949776.0474	368249.6445	OB-14	1950317.0872	368405.8925

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

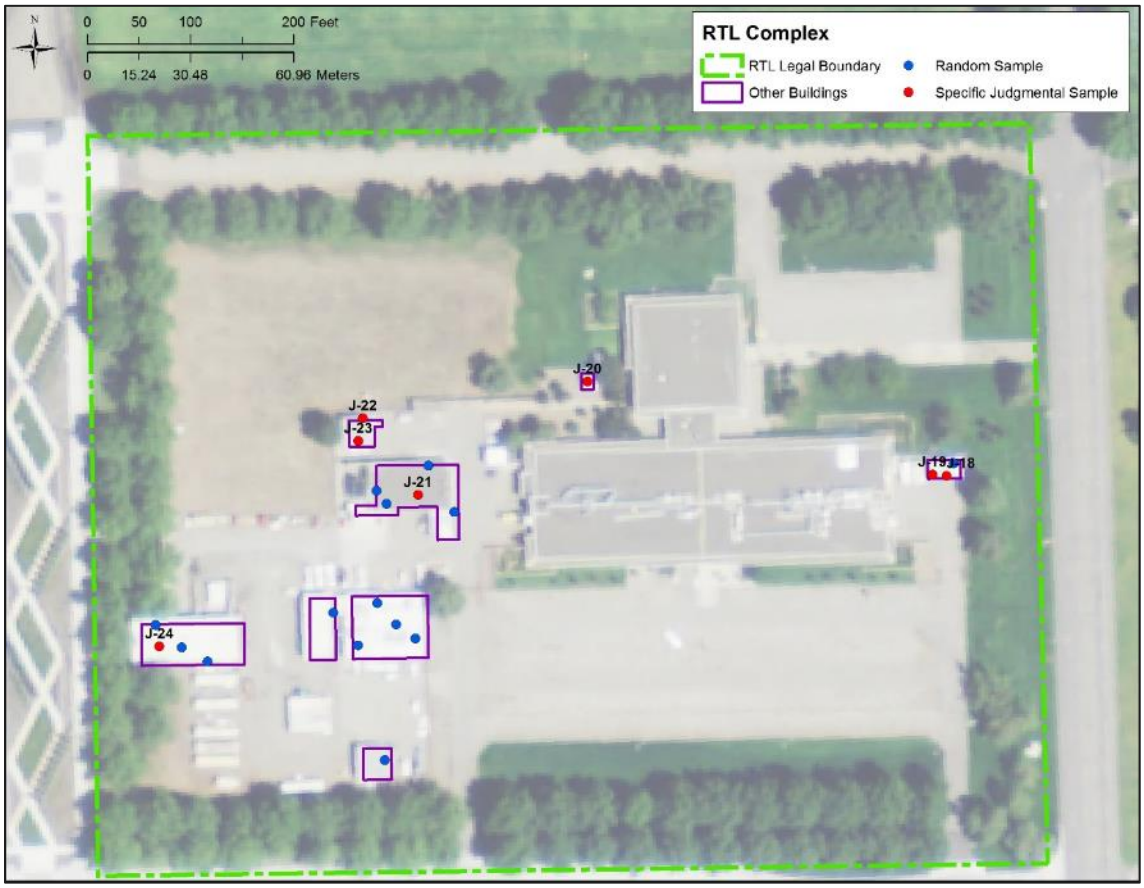

Figure A.6. RTL 510, 524, 540, 550, 560, 570, 580, and 590 building footprint with random and specific judgmental sample locations

A.5 Pipelines

Table A.5 presents the 14 random sample locations for the pipelines (PL) survey unit. Figure A.7 shows the locations of the random samples and the specific judgmental samples.

Table A.5. Random sample locations for the pipelines survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
PL-1	1949856.8567	368419.8214	PL-8	1949987.0934	368419.1778
PL-2	1949765.7089	368431.4069	PL-9	1949674.5864	368445.2450
PL-3	1949948.0046	368425.6142	PL-10	1949863.3927	368424.9705
PL-4	1949948.0300	368441.0614	PL-11	1949724.5007	368294.6343
PL-5	1949765.7343	368423.6832	PL-12	1949811.3082	368428.8323
PL-6	1949921.9878	368417.8905	PL-13	1949941.5194	368446.2105
PL-7	1949713.6498	368443.9578	PL-14	1949889.4350	368440.4178

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

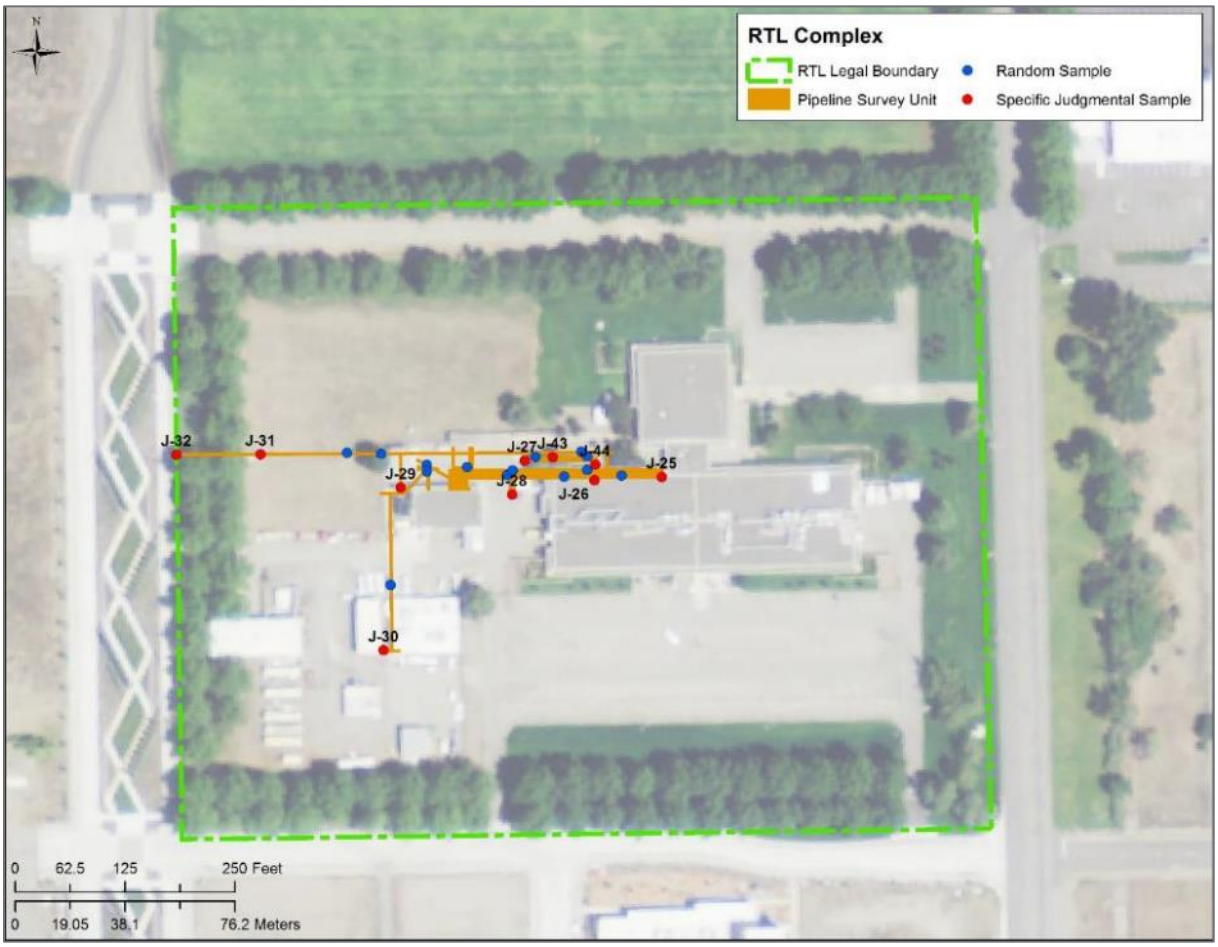

Figure A.7. Pipelines survey unit with random and specific judgmental sample locations

A.6 Paved Areas

Table A.6 presents the 14 random sample locations for the paved areas (PA) survey unit. Figure A.8 shows the locations of the random samples and the specific judgmental samples.

Table A.6. Random sample locations for the paved areas survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
PA-1	1950231.7815	368284.4718	PA-8	1950260.4979	368706.3693
PA-2	1949887.1852	368363.5776	PA-9	1950145.6324	368266.8927
PA-3	1949973.3343	368442.6833	PA-10	1949729.2453	368187.7869
PA-4	1949743.6034	368680.0007	PA-11	1949844.1107	368293.2613
PA-5	1949628.7380	368310.8404	PA-12	1950303.5724	368530.5786
PA-6	1949858.4689	368152.6288	PA-13	1950246.1397	368214.1555
PA-7	1950030.7670	368231.7346	PA-14	1950131.2742	368688.7902

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

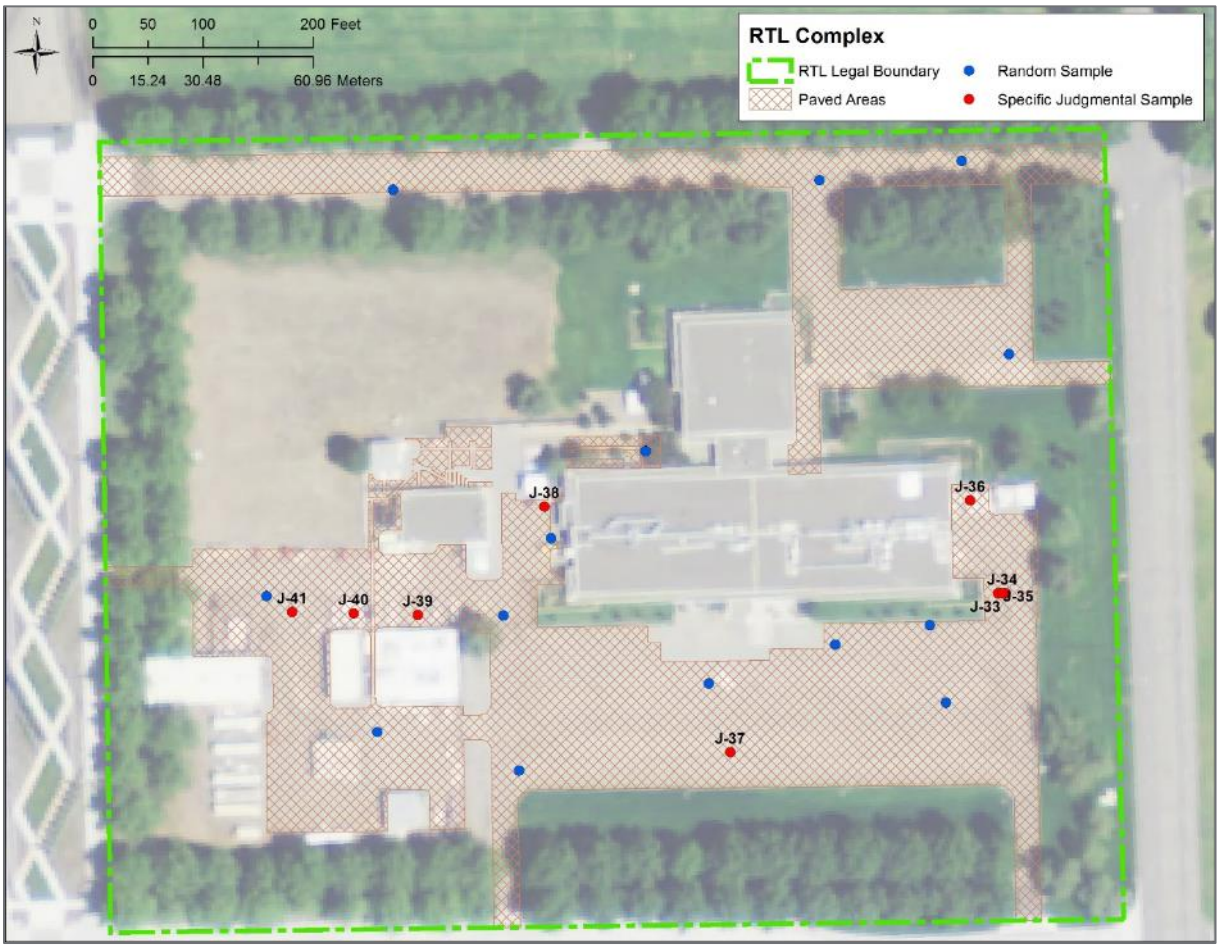

Figure A.8. Paved areas with random and specific judgmental sample locations

A.7 Open Areas

Table A.7 presents the 14 random sample locations for the open areas (OA) survey unit. Figure A.9 shows the locations of the random samples and the specific judgmental samples.

Table A.7. Random sample locations for the open areas survey unit

Sample No.	Easting (X)	Northing (Y)	Sample No.	Easting (X)	Northing (Y)
OA-1	1950216.7023	368095.7960	OA-8	1949495.9811	368583.5734
OA-2	1950046.8813	368054.7988	OA-9	1949653.2461	368507.0816
OA-3	1949520.3809	368043.5373	OA-10	1949967.7761	368621.8193
OA-4	1949784.9541	368078.4155	OA-11	1949574.6136	368430.5898
OA-5	1949564.4764	368183.0502	OA-12	1949889.1436	368545.3275
OA-6	1950333.9806	368453.5404	OA-13	1950212.6965	368678.7106
OA-7	1950403.1745	368201.4085	OA-14	1949560.7599	368720.6433

Easting (X) and northing (Y) coordinates presented in NAD 1983 Washington State Plane South (4602) in feet (EPSG 2286).

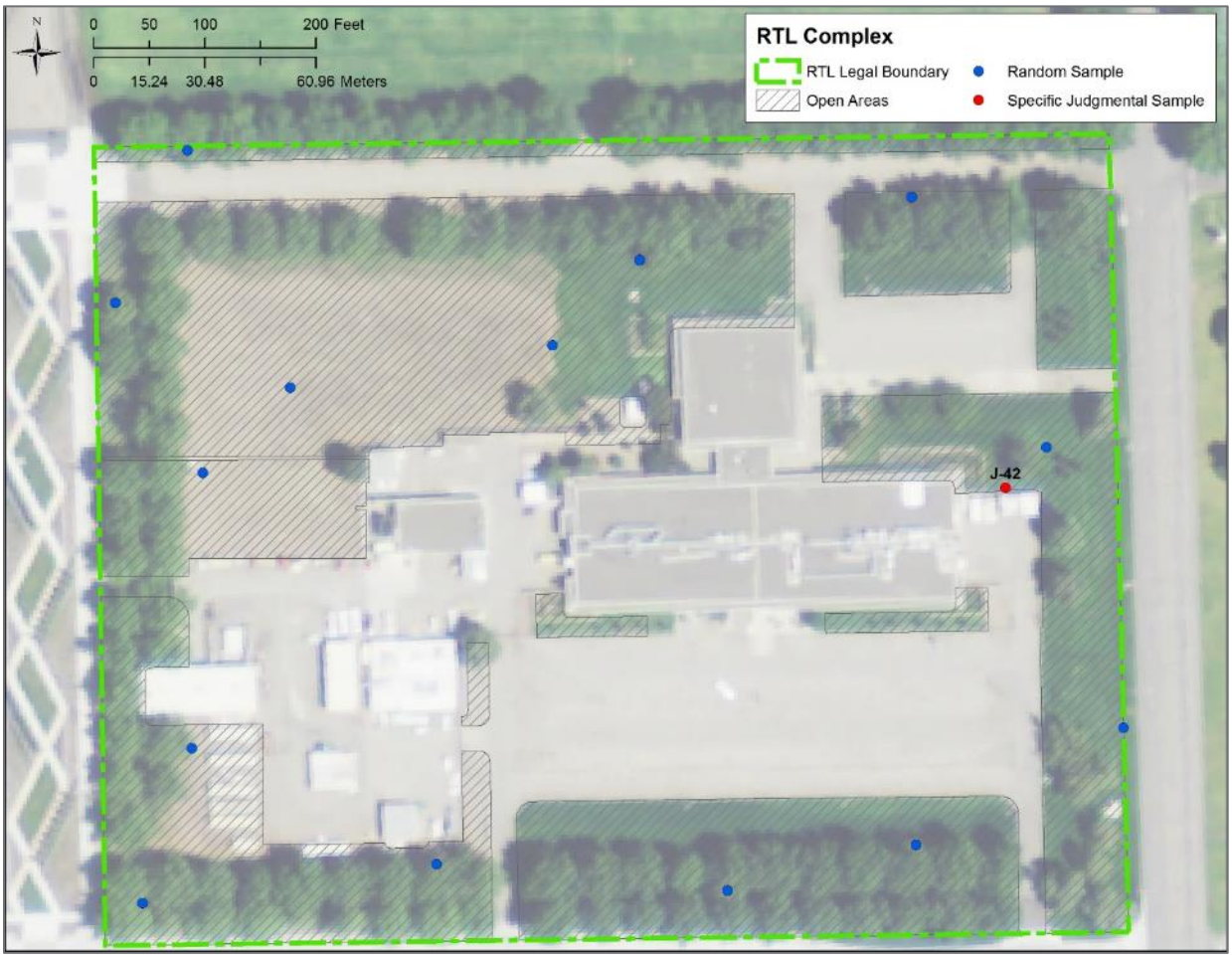

Figure A.9. Open areas with random and specific judgmental sample locations

A.8 References

Biebesheimer FH, HF Kerschner, LJ Oukrop, and MJ Minette. 2016. *Research Technology Laboratory Complex Deactivation, Decontamination, Decommissioning, & Demolition Project Transition Plan*. S740277-PLAN-09, Rev., Pacific Northwest National Laboratory, Richland, Washington.

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EPSG 2286. North American Datum (NAD) 1983 State Plane Washington South FIPS 4602 (US Feet).

McCoy MW. 1999. *Final Report on the Removal of Radioactive Liquid Waste Tanks from RTL*. Pacific Northwest Laboratory, Richland, Washington.

Matzke BD, Wilson JE, Newburn LL, Dowson ST, Hathaway JE, Sego LH, Bramer LM, and Pulsipher BA. 2014. *Visual Sample Plan Version 7.0 User's Guide*. PNNL-23211, Pacific Northwest National Laboratory, Richland, Washington. Available at https://vsp.pnnl.gov/.

NRC. 2000. *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM). NUREG-1575, Rev. 1; EPA 402-R-97-016, Rev. 1; DOE/EH-0624, Rev.1, U.S. Nuclear Regulatory Commission, Washington, D.C.

Appendix B – Layback Scoping Study Results

This appendix briefly summarizes the results from the layback scoping study to confirm the assumption that the soil piles created from the excavation of the Research Technology Laboratory (RTL) 520 building were non-impacted. Layback is the soil removed during excavation to create a slope upon which the soil will not fall back or collapse into the excavation area. The layback did not include soil from around the RTL 520 tank vault and excavated pipelines survey units, or from any other areas of known potential contamination sources.

Samples were collected and analyzed as described in the *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan* (FSS plan; Bunn et al. 2018) and the project memo "Scoping Study of the Layback Piles at the RTL Complex" (Bunn 2018). Laboratory results were independently validated (Level C) by Analytical Quality Associates. The maximum reported result for each of the radiological contaminant of potential concern (COPCs) are given in Table B.1.

In all cases, the maximum reported values are well below (by 30x or more) the action levels and release limits defined in the FSS plan (Bunn et al. 2018). Many of the maximums are associated with a quality flag (U flag) in Table B.1 to identify results that were less than method detection limits. Figure B.1 presents reported values for each radionuclide on a lognormal scale to show the range of concentrations relative to the associated action levels and release limits. Results were below both release limits and action levels. These results confirm assumptions that the layback piles do not contain COPCs above the release limits for the disposition of the RTL Complex, and can be used to backfill the excavated areas that are cleared for unrestricted use in accordance with the *Battelle Facilities Restoration Program Management Plan Volume I* and the *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition Program* (Smoter and Biebesheimer 2017; Biebesheimer 2018).

Table B.1. Maximum concentrations reported from layback scoping study

Radiological COPC (pCi/g)	Release Limit	Action Level	Maximum Concentration for All Layback Pile Samples	Quality Flag
Plutonium-238	800	600	0.00889	U
Plutonium-239/240	740	555	0.032	U
Plutonium-241	30,000	22,500	1.55	U
Uranium-234[(a)]	700	525	0.206	-
Uranium-235[(b)]	60	45	0.0251	U
Uranium-238	280	210	0.201	-
Cobalt-60	3.7	2.8	0.0932	U
Sum of Fractions			0.0267	

U = less than detection limit.
(a) Analytical result reported as uranium-233/234.
(b) Analytical result reported as uranium-235/236.

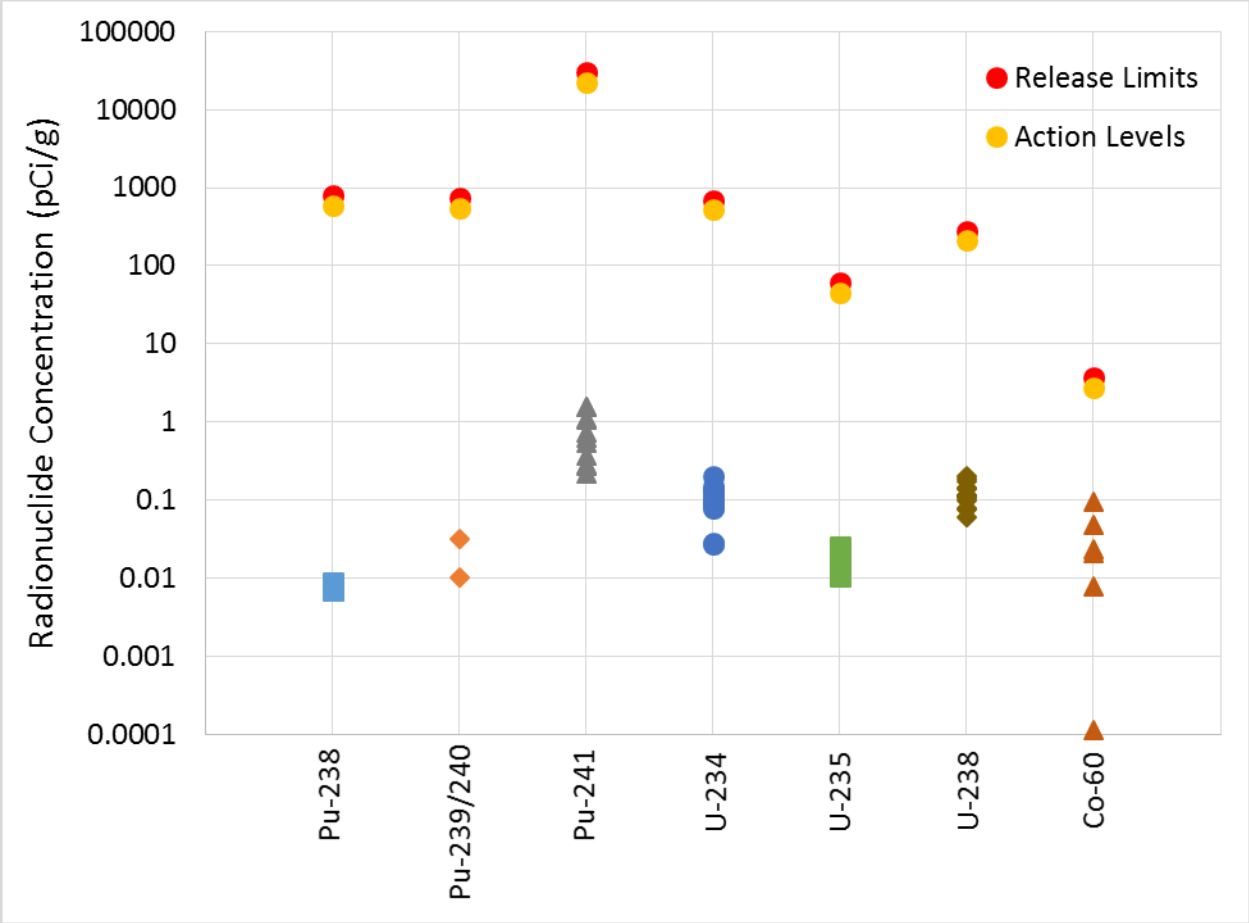

Figure B.1. Lognormal plot indicating that radionuclide concentrations are below the action levels and release limits for the layback samples

References

Biebesheimer FH. 2018. *Battelle Facilities Restoration Program Management Plan, Volume II – RTL Complex Disposition Program*. S740277-PLAN-12, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

Bunn AL. 2018. Memorandum from Amoret Bunn to Harrison Kerschner and Elizabeth Golovich. "Scoping Study of the Layback Piles at the RTL Complex." October 31, 2018. S740277-18-04, Pacific Northwest National Laboratory, Richland, Washington.

Bunn AL, JK Snelling, and AM Gorton. 2018. *RTL Disposition Program Final Status Survey Plan.* S740277-PLAN-14. Pacific Northwest National Laboratory. Richland, Washington.

Smoter RL and FH Biebesheimer. 2017. *Battelle Facilities Restoration Program Management Plan Volume I*. S697201-PLAN-PM-003, Rev. 2, Pacific Northwest National Laboratory, Richland, Washington.

Appendix C – Survey Results by Survey Unit

This appendix presents results from the final status survey by location on an image of the Research Technology Laboratory (RTL) Complex. The seven radiological contaminant of potential concern (COPCs) are depicted individually by survey unit in the sections below. Random sample locations are identified by round markers and judgmental sample locations are identified by triangle markers. Sample location coordinates are given in Appendix A. The figures in the sections below show that there are no observable trends in the concentrations across the survey unit (i.e., no increase in concentration toward a location).

C.1 520 Building Footprint Survey Unit

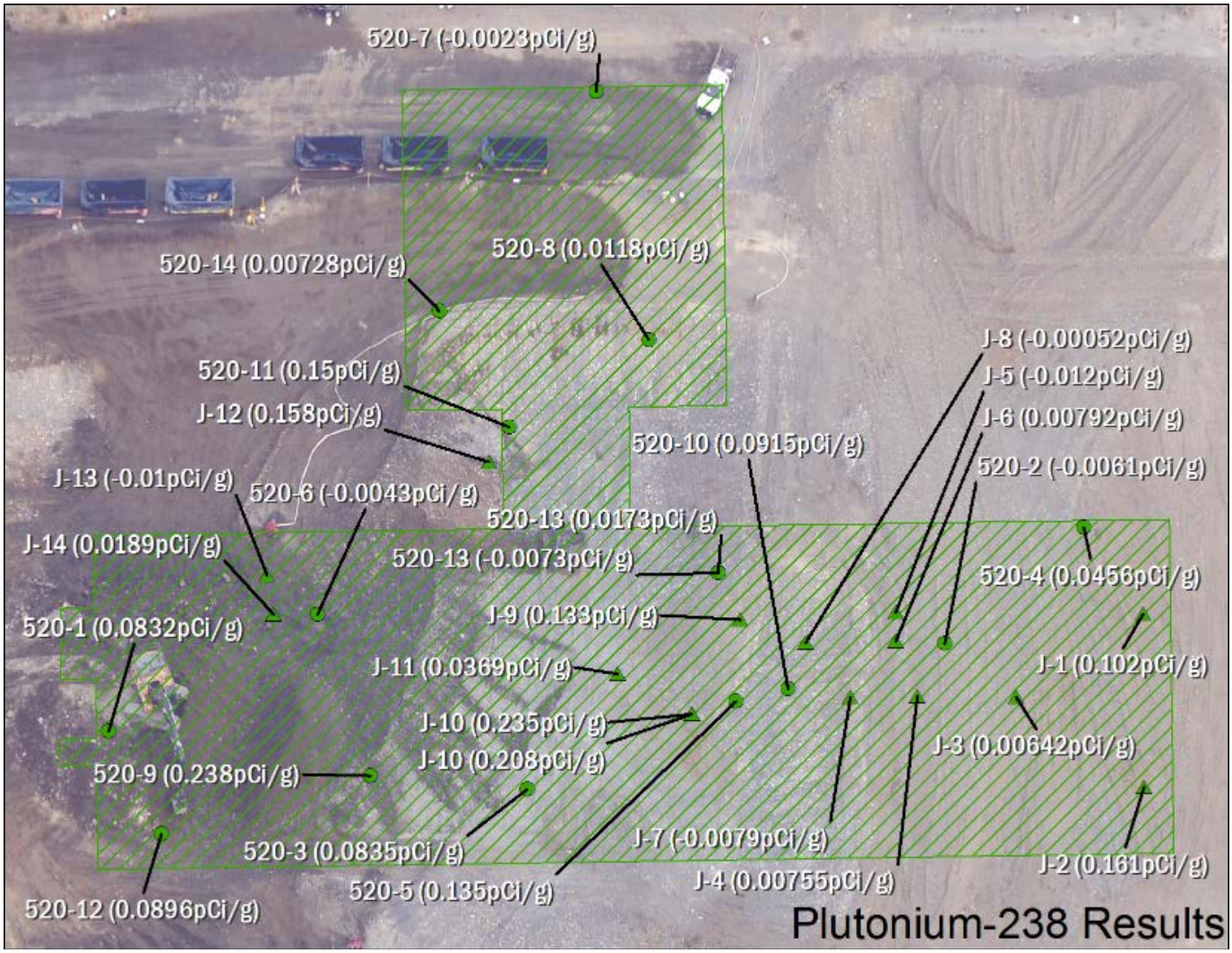

Figure C.1. Plutonium-238 results from sample locations within the 520 building footprint survey unit

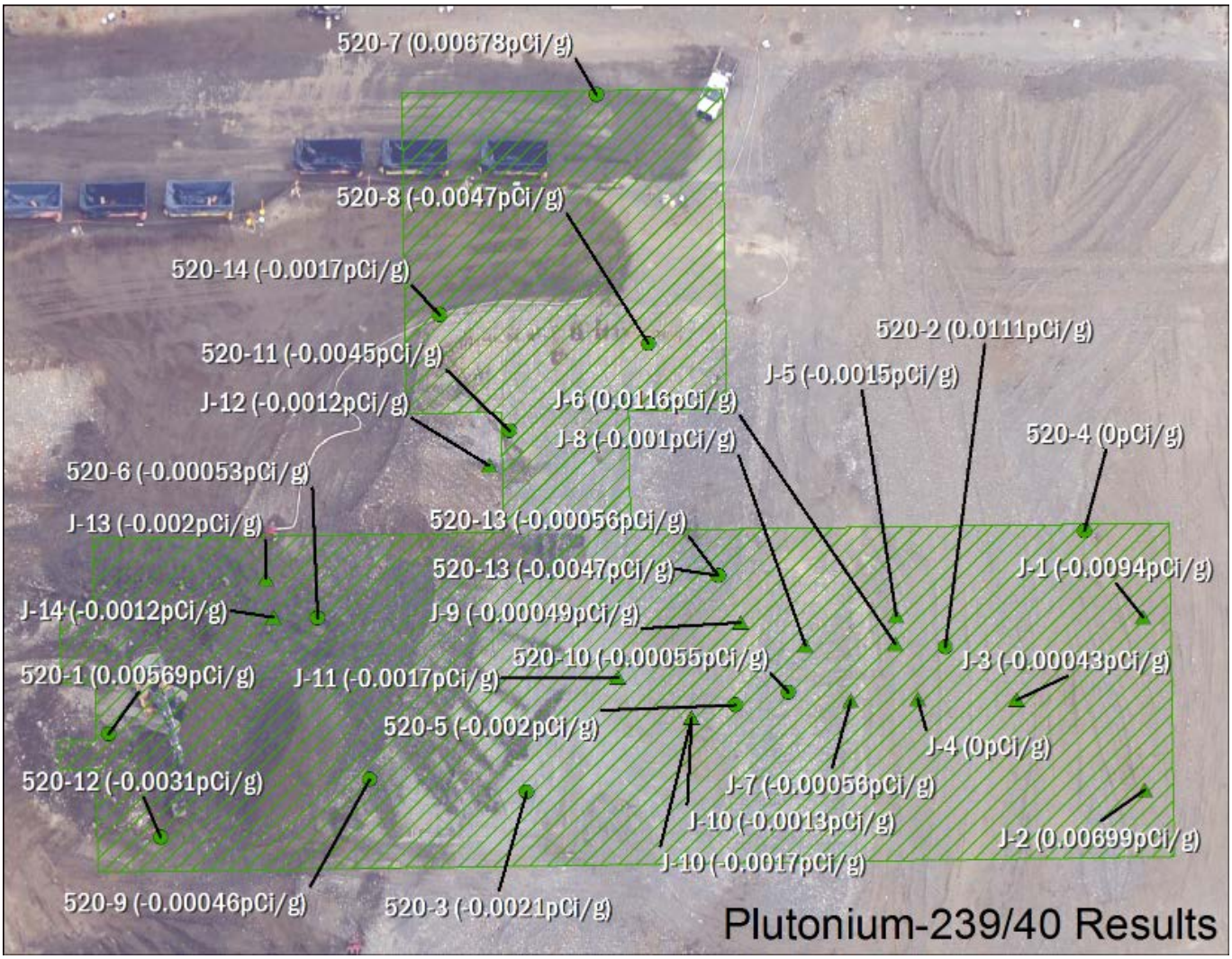

Figure C.2. Plutonium-239/240 results from sample locations within the 520 building footprint survey unit

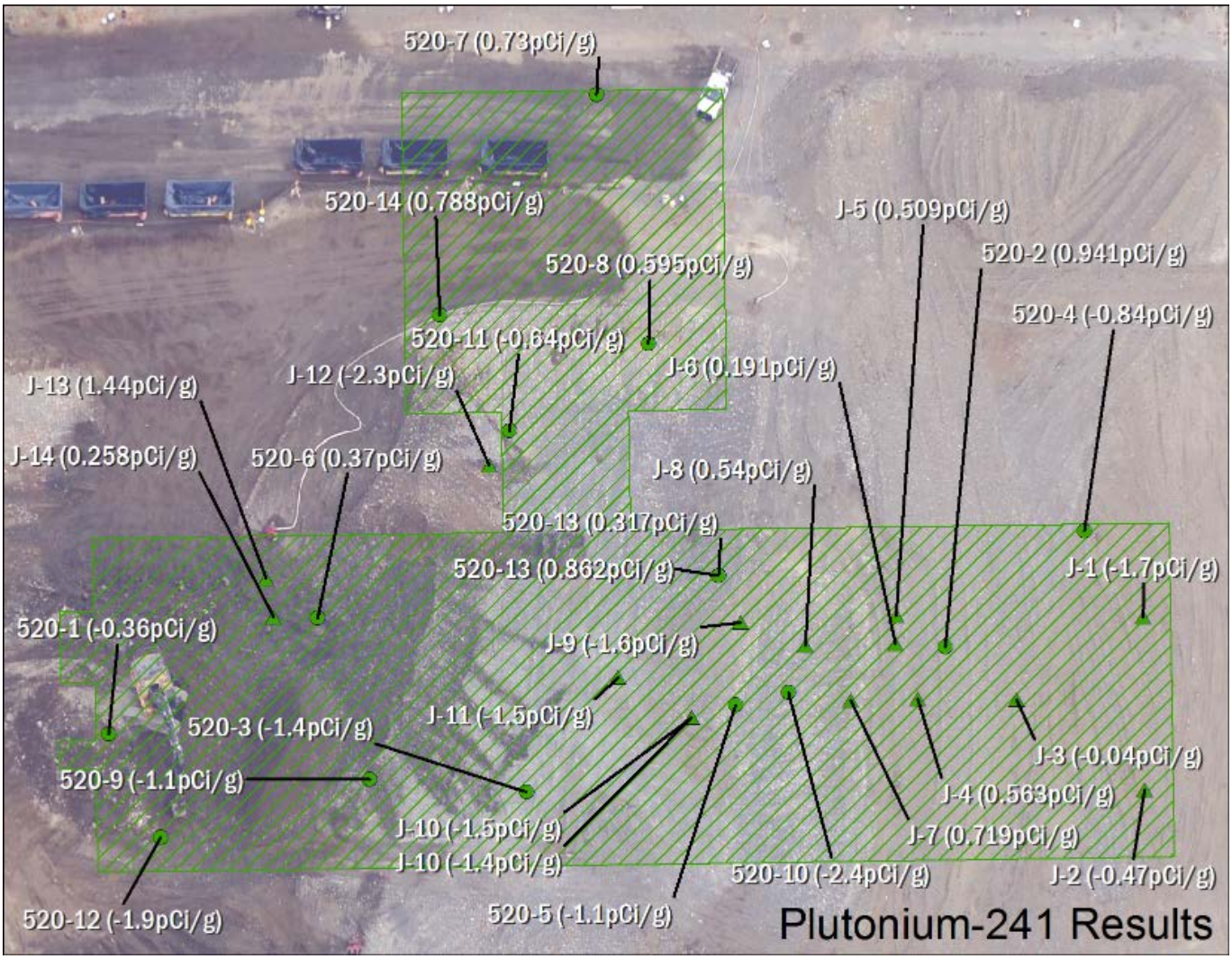

Figure C.3. Plutonium-241 results from sample locations within the 520 building footprint survey unit

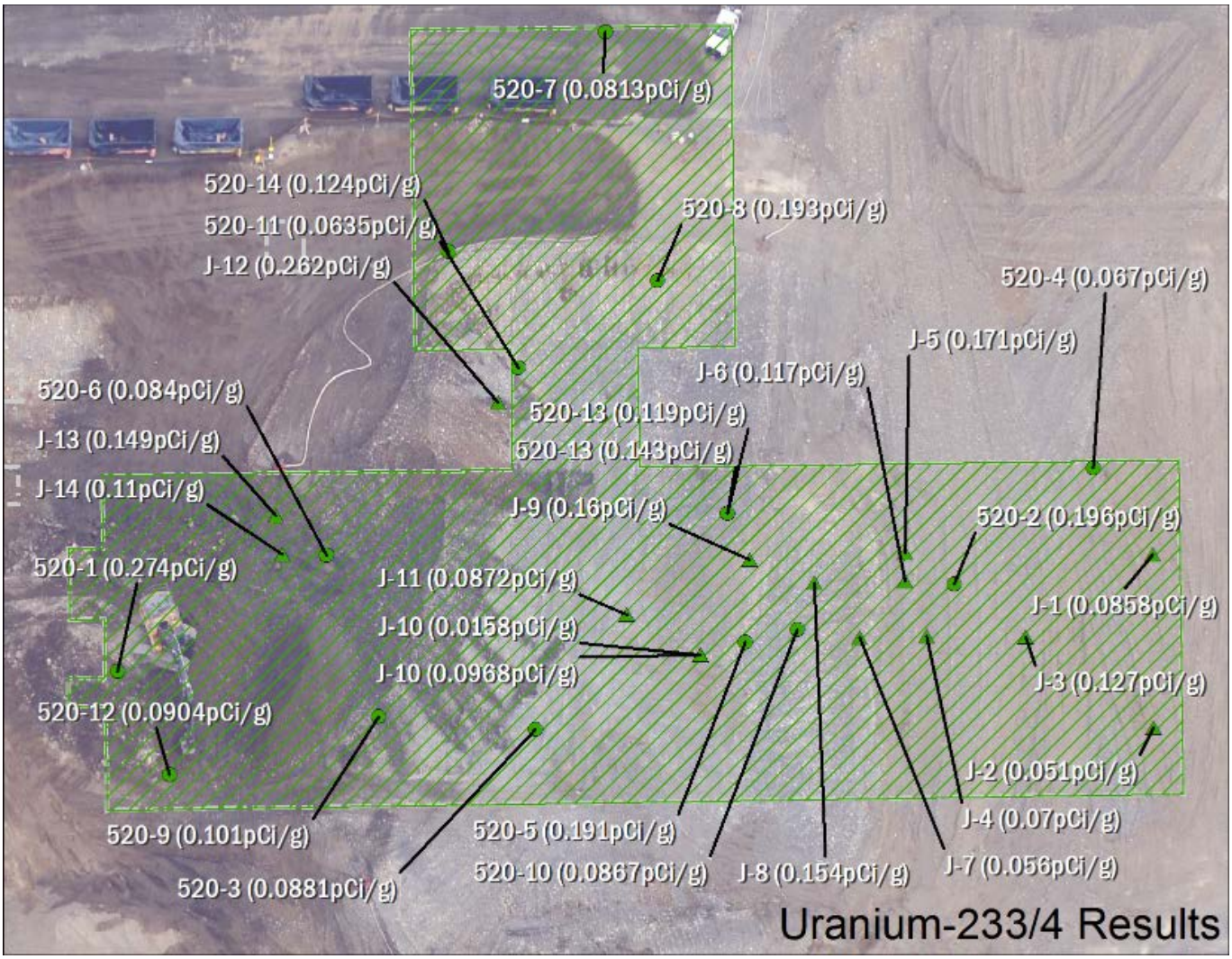

Figure C.4. Uranium-233/234 results from sample locations within the 520 building footprint survey unit

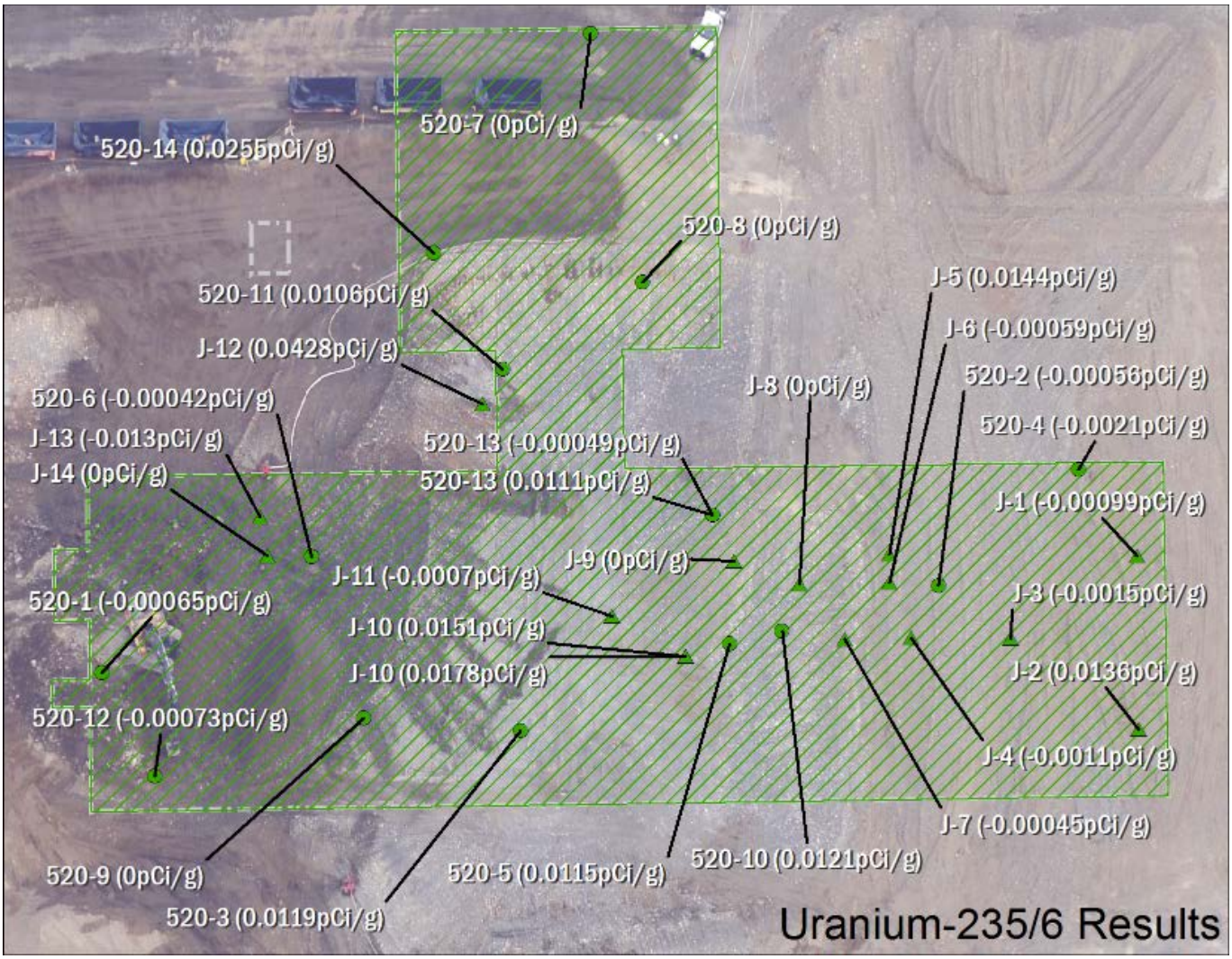

Figure C.5. Uranium-235/236 results from sample locations within the 520 building footprint survey unit

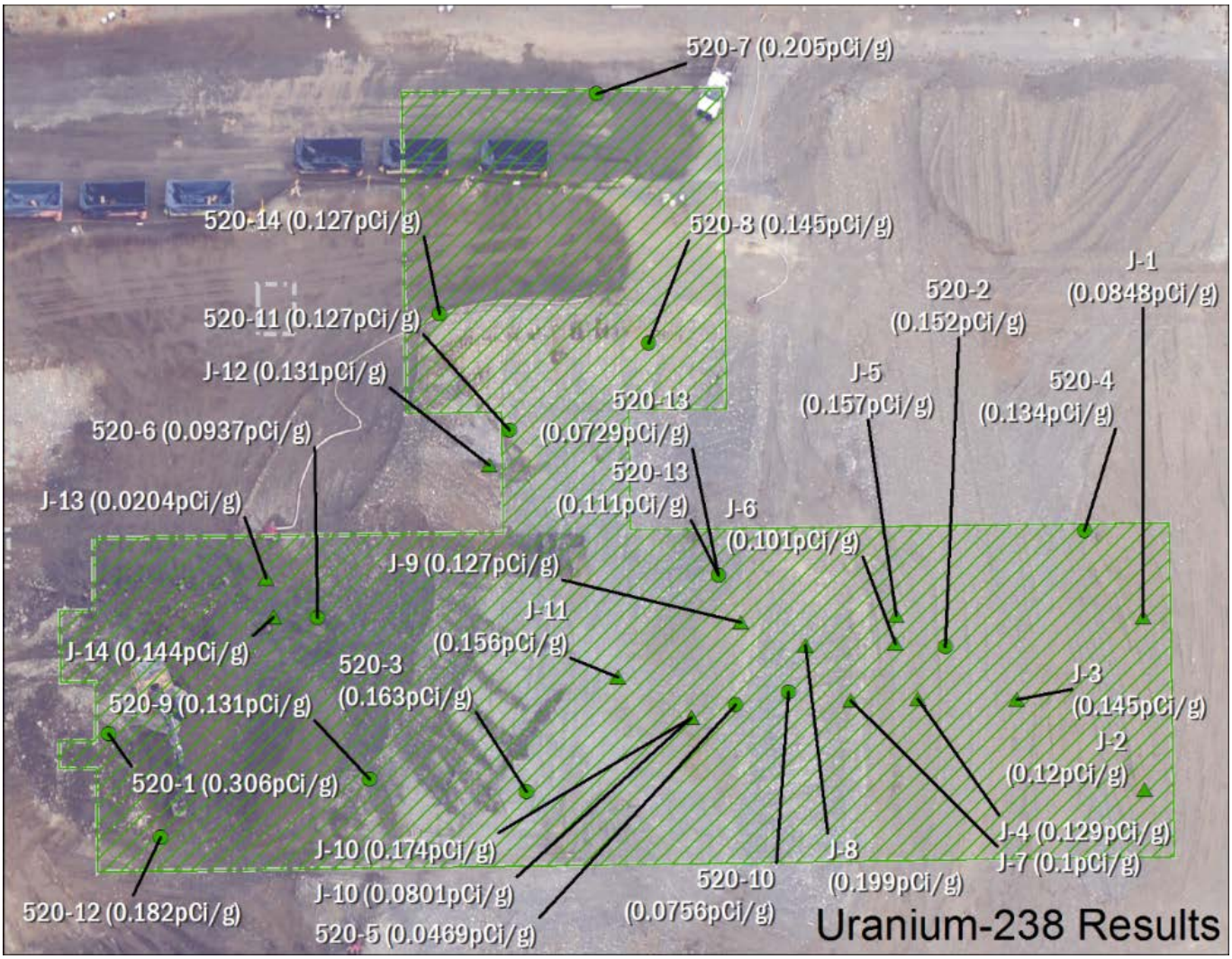

Figure C.6. Uranium-238 results from sample locations within the 520 building footprint survey unit

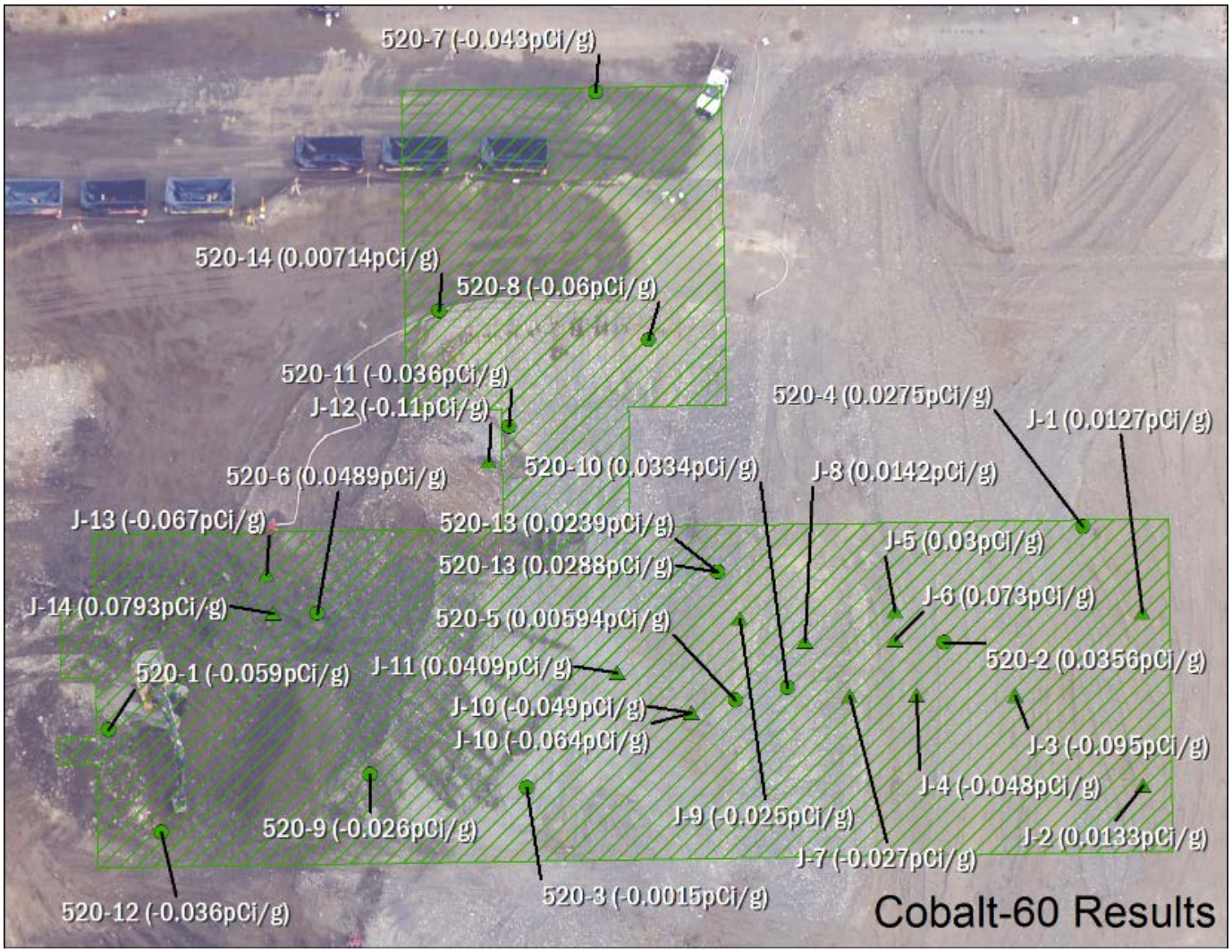

Figure C.7. Cobalt-60 results from sample locations within the 520 building footprint survey unit

C.2 Tank Vault and 530 Building Footprint Survey Unit

Figure C.8. Plutonium-238 results from sample locations within the tank vault and 530 building footprint survey unit

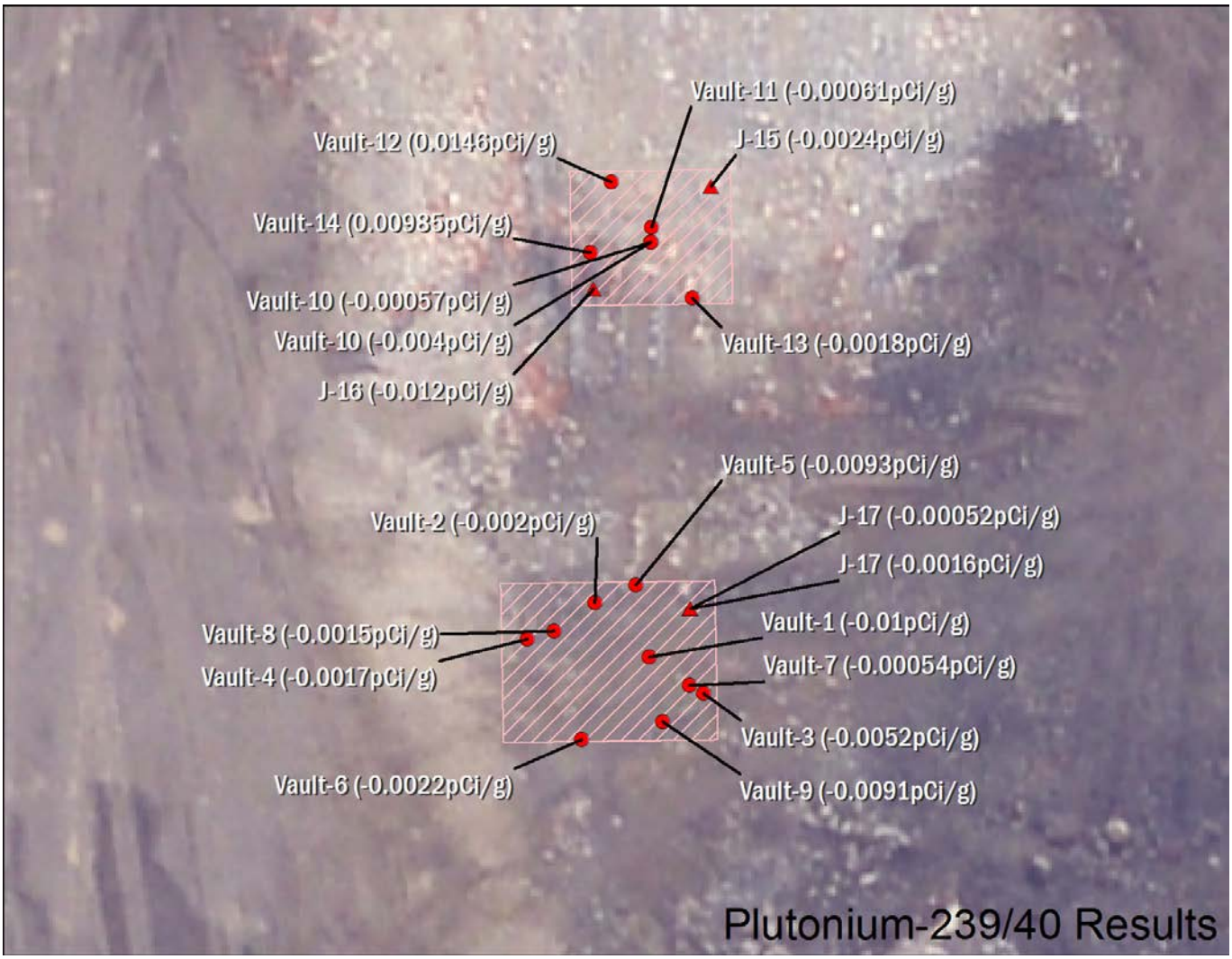

Figure C.9. Plutonium-239/240 results from sample locations within the tank vault and 530 building footprint survey unit

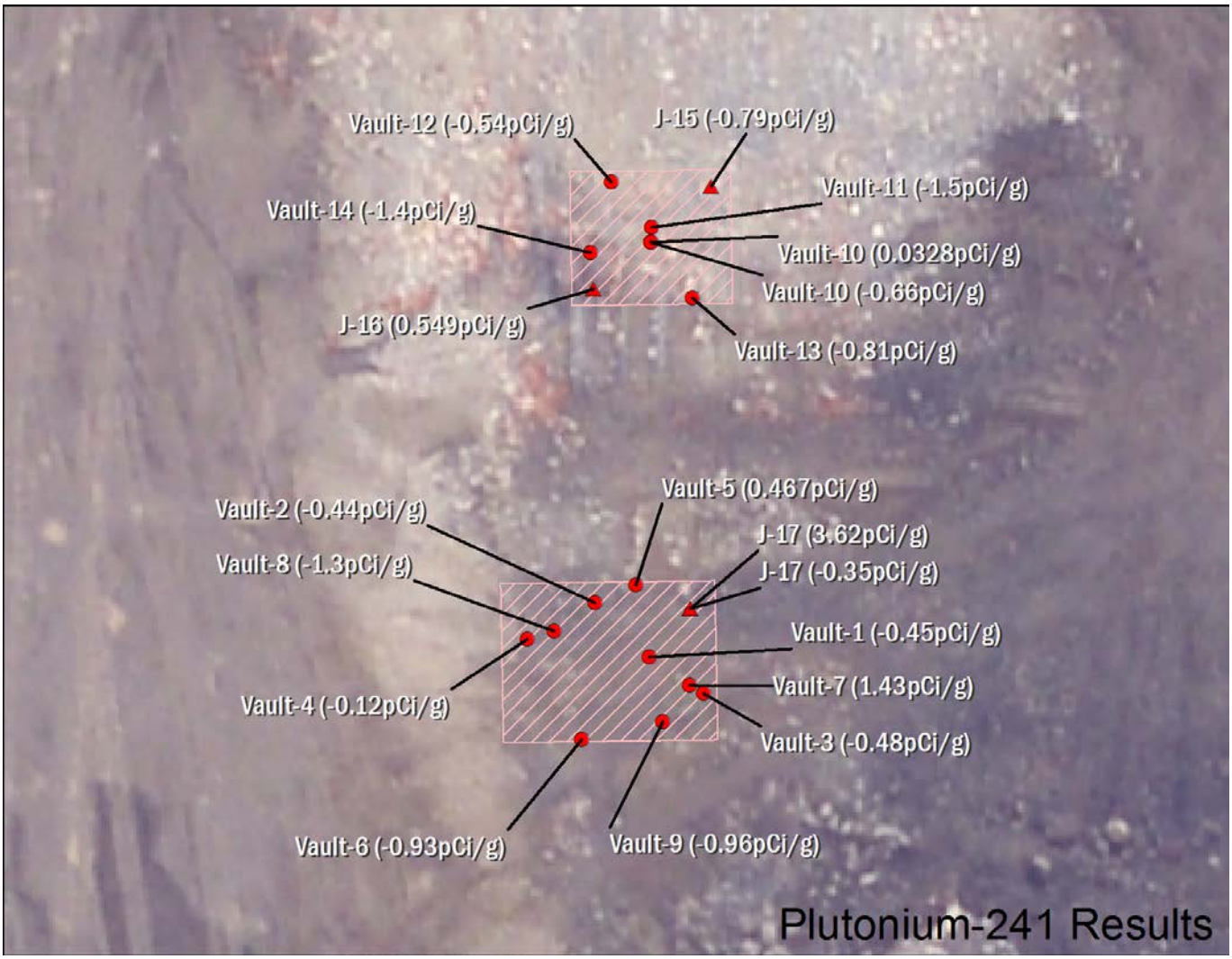

Figure C.10. Plutonium-241 results from sample locations within the tank vault and 530 building footprint survey unit

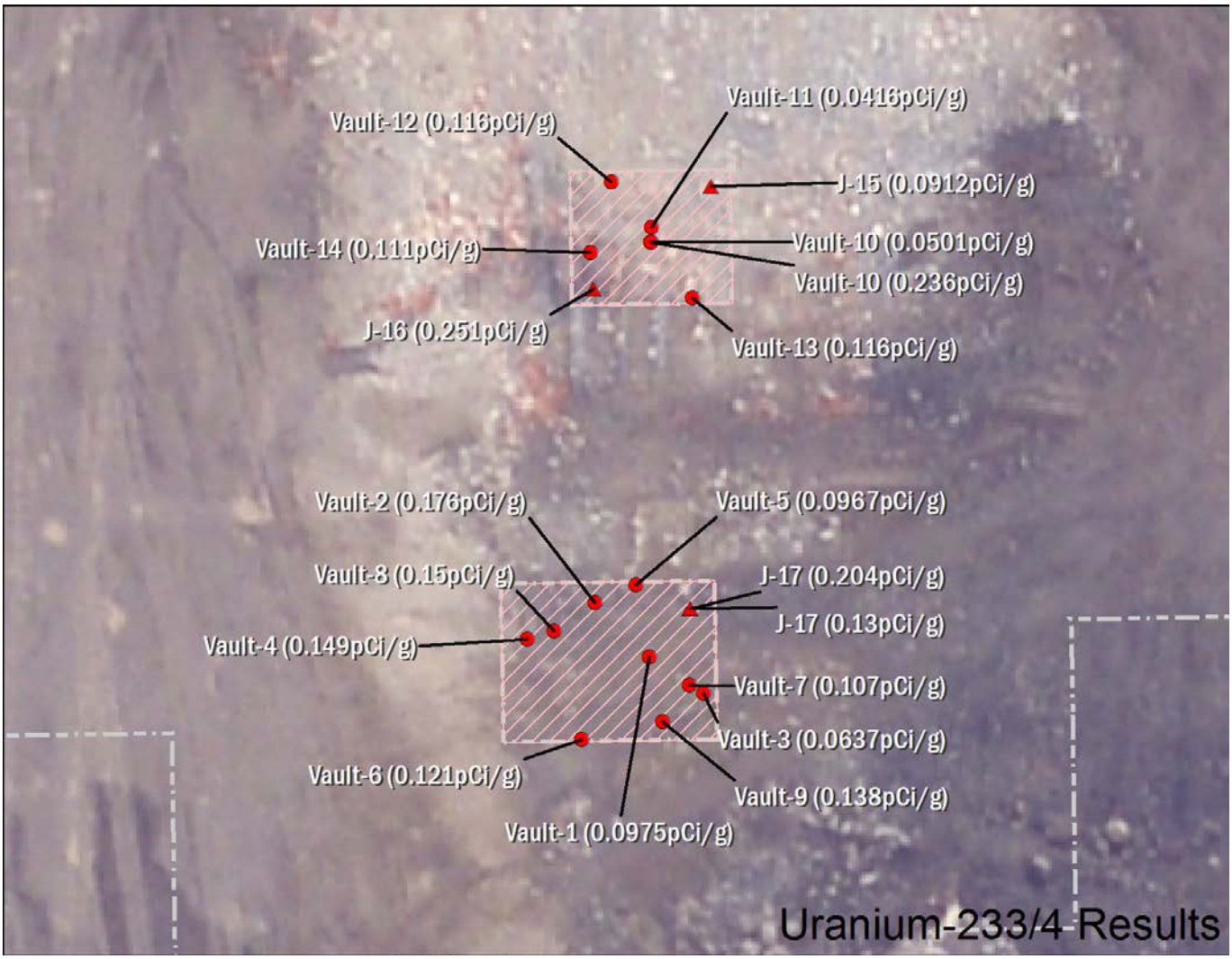

Figure C.11. Uranium-233/234 results from sample locations within the tank vault and 530 building footprint survey unit

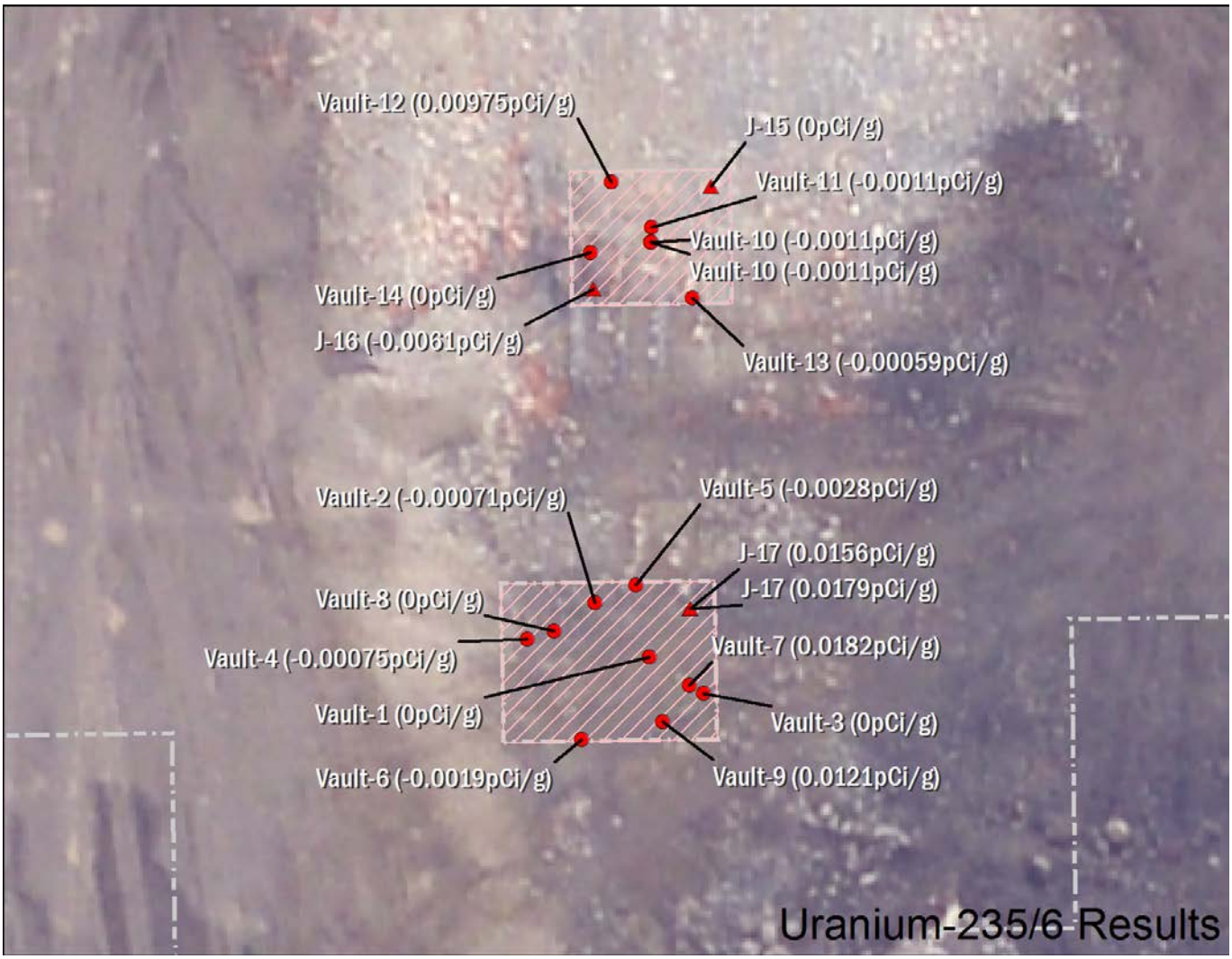

Figure C.12. Uranium-235/236 results from sample locations within the tank vault and 530 building footprint survey unit

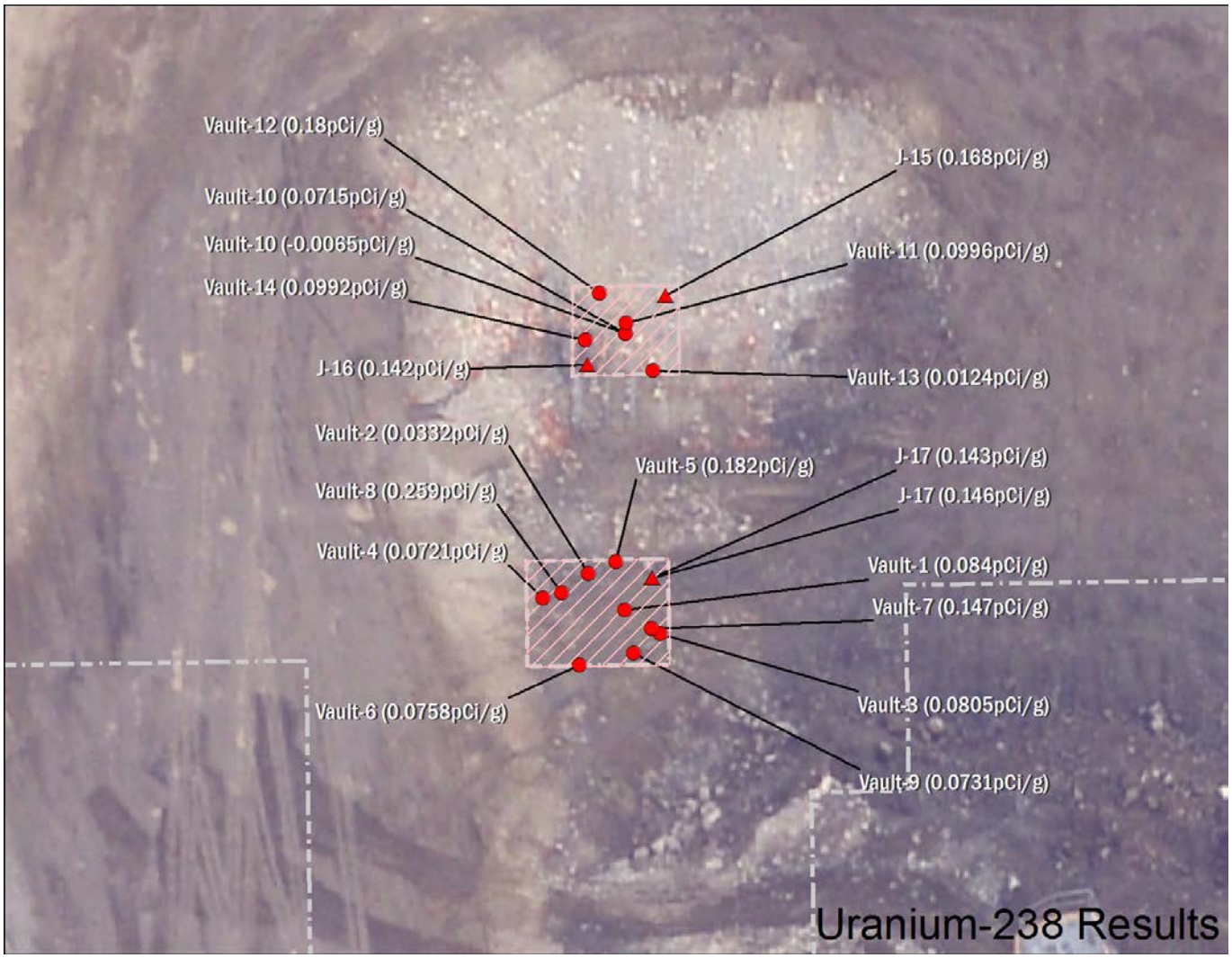

Figure C.13. Uranium-238 results from sample locations within the tank vault and 530 building footprint survey unit

Figure C.14. Cobalt-60 results from sample locations within the tank vault and 530 building footprint survey unit

C.3 Other Buildings Footprint Survey Unit

Figure C.15. Plutonium-238 results from sample locations within the other buildings footprint survey unit

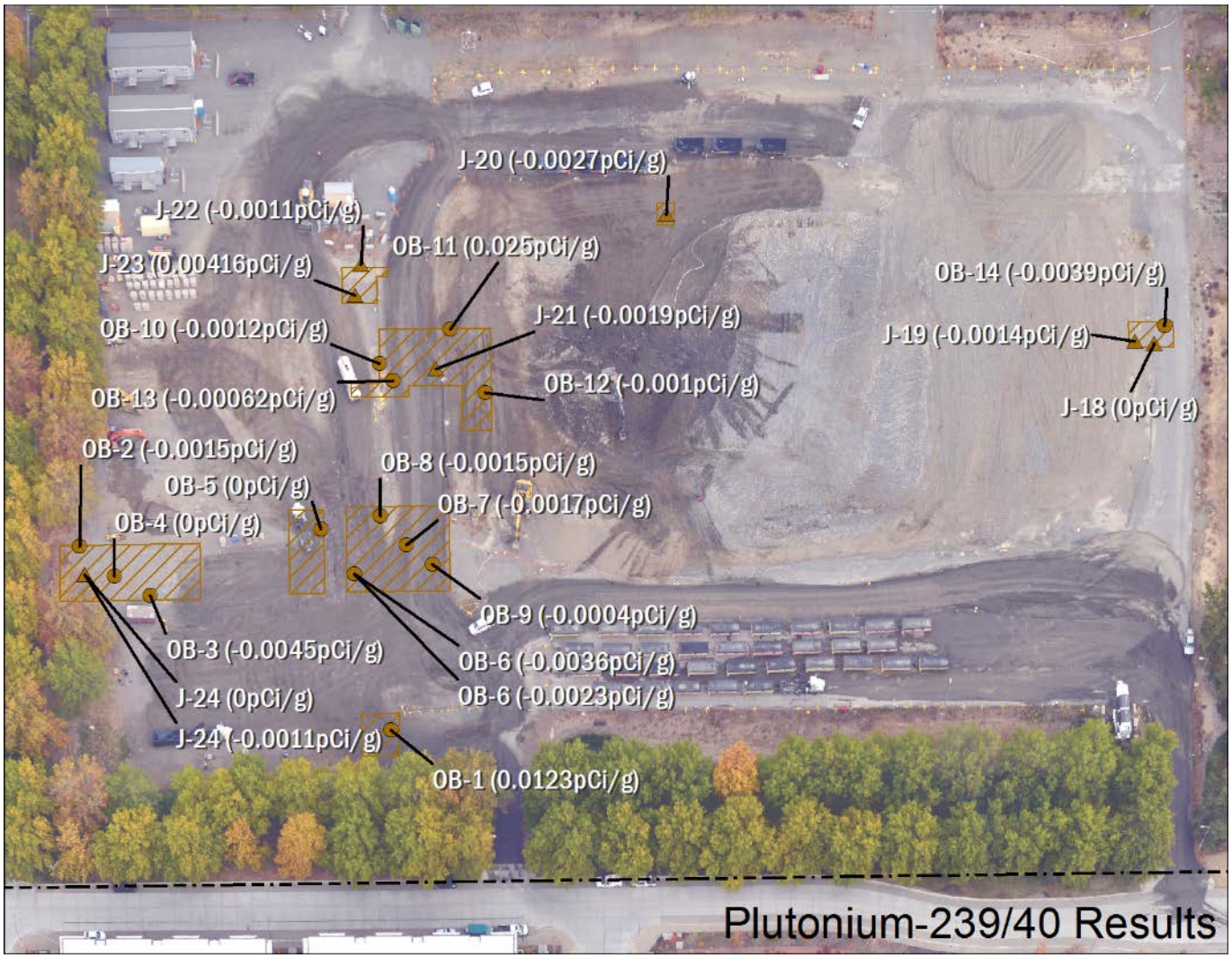

Figure C.16. Plutonium-239/240 results from sample locations within the other buildings footprint survey unit

Figure C.17. Plutonium-241 results from sample locations within the other buildings footprint survey unit

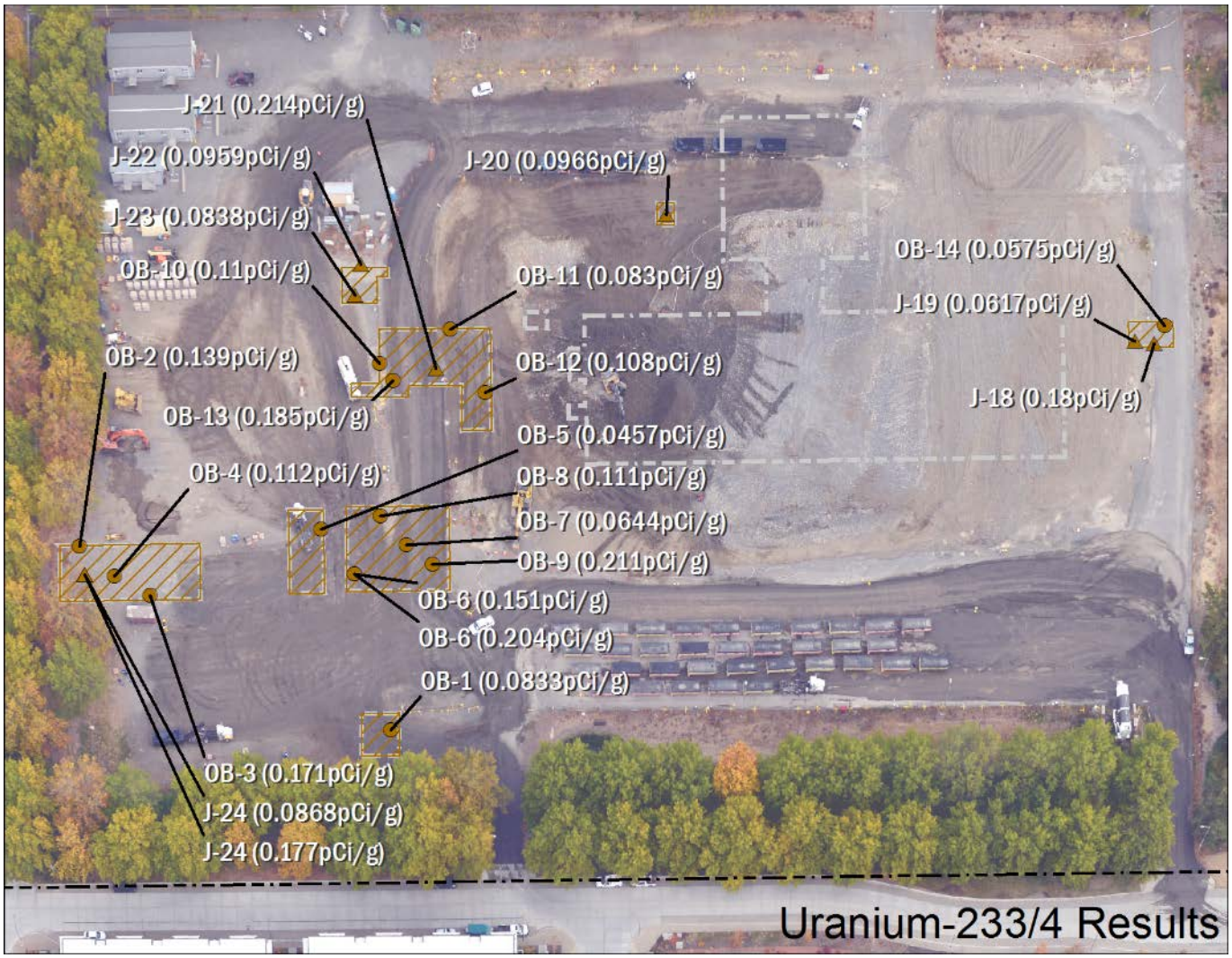

Figure C.18. Uranium-233/234 results from sample locations within the other buildings footprint survey unit

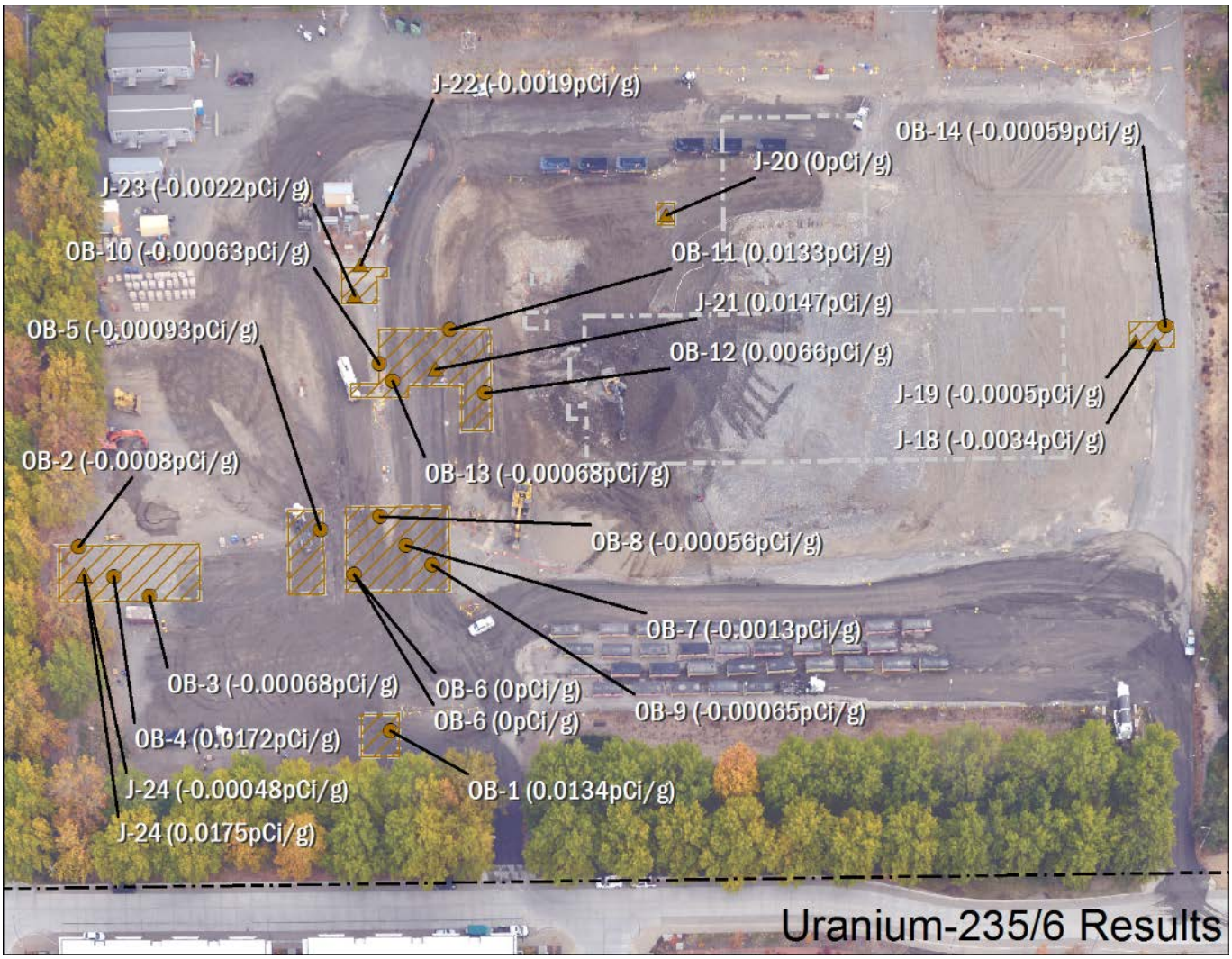

Figure C.19. Uranium-235/236 results from sample locations within the other buildings footprint survey unit

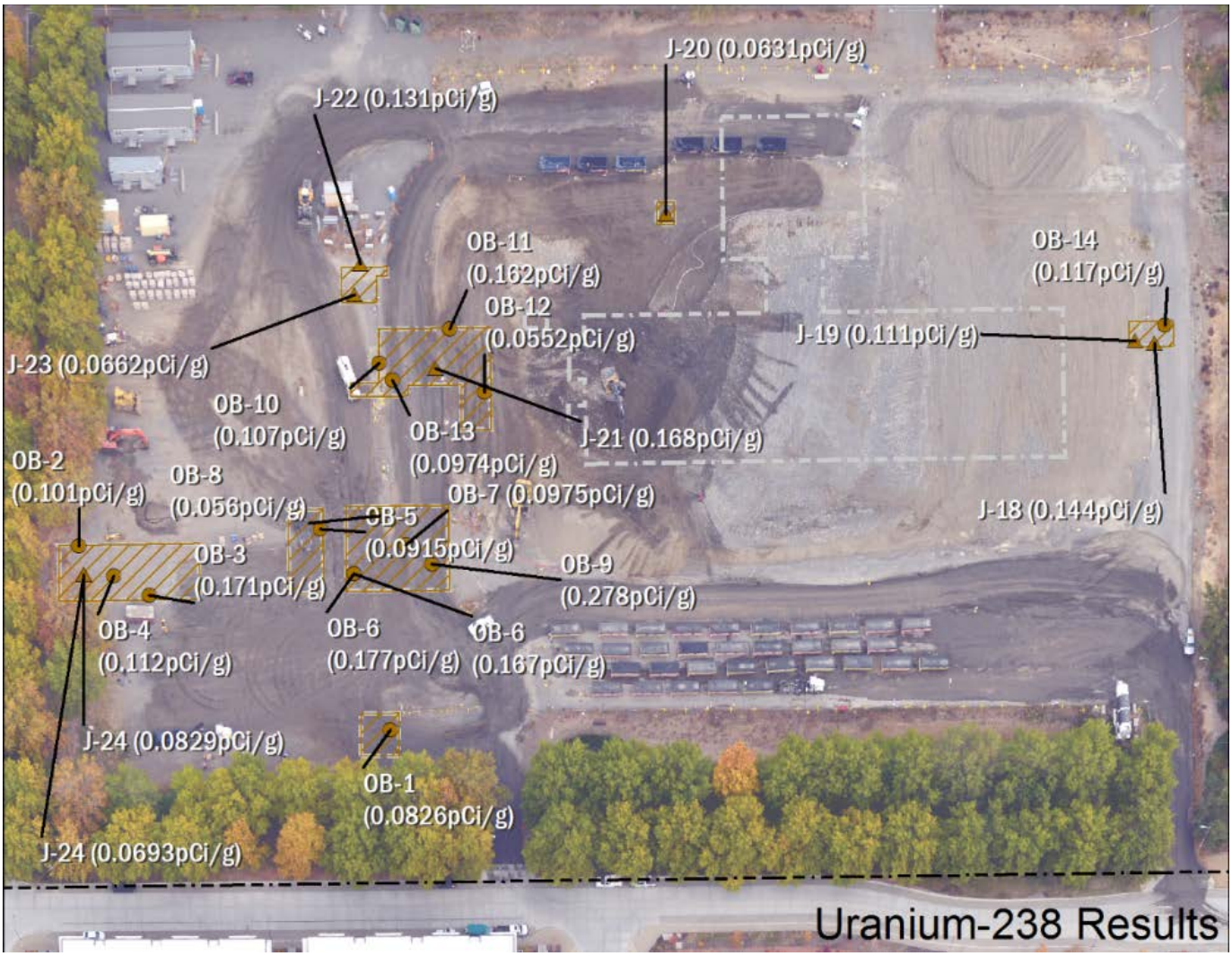

Figure C.20. Uranium-238 results from sample locations within the other buildings footprint survey unit

Figure C.21. Cobalt-60 results from sample locations within the other buildings footprint survey unit

C.4 Pipelines Survey Unit

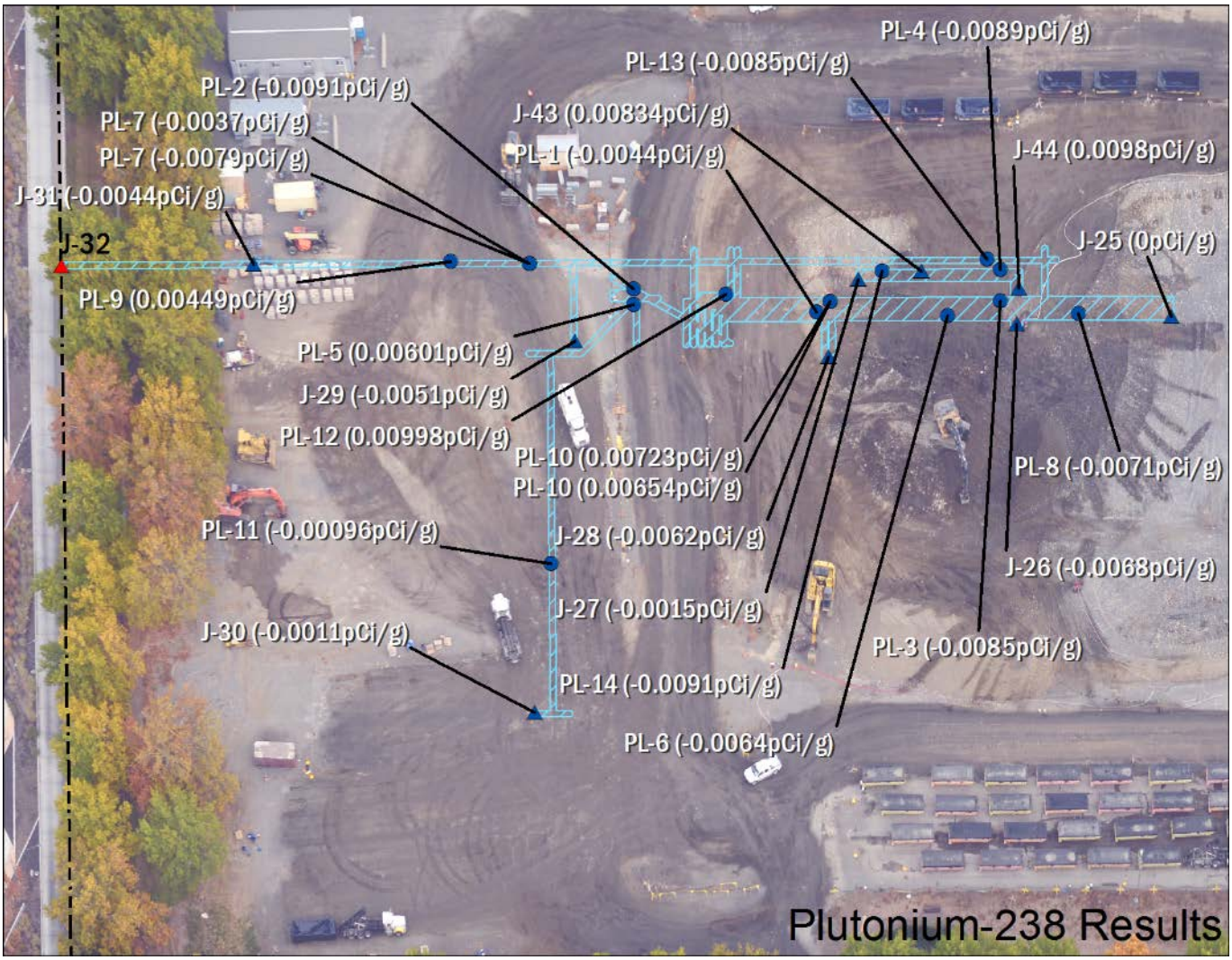

Figure C.22. Plutonium-238 results from sample locations within the pipelines survey unit

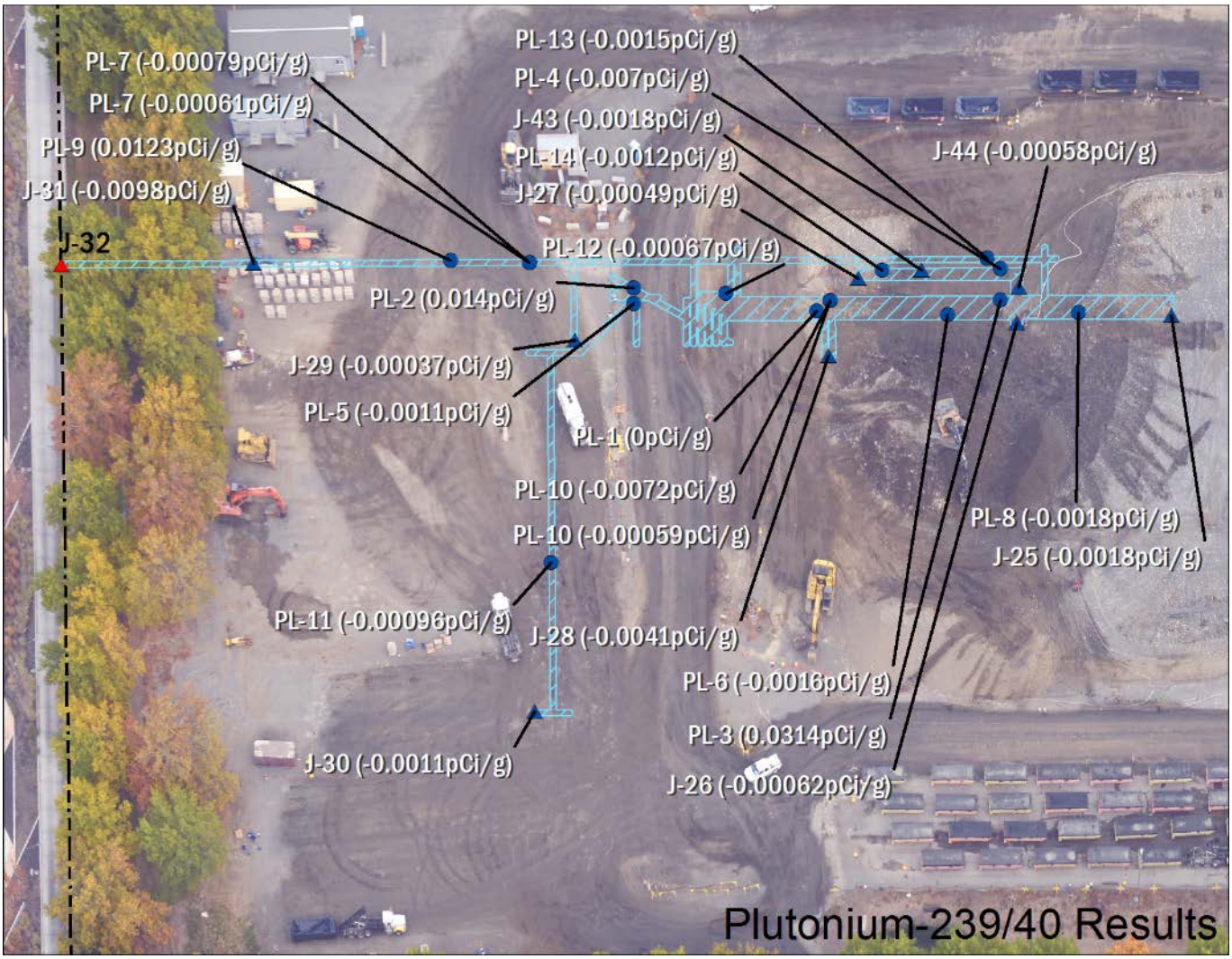

Figure C.23. Plutonium-239/240 results from sample locations within the pipelines survey unit

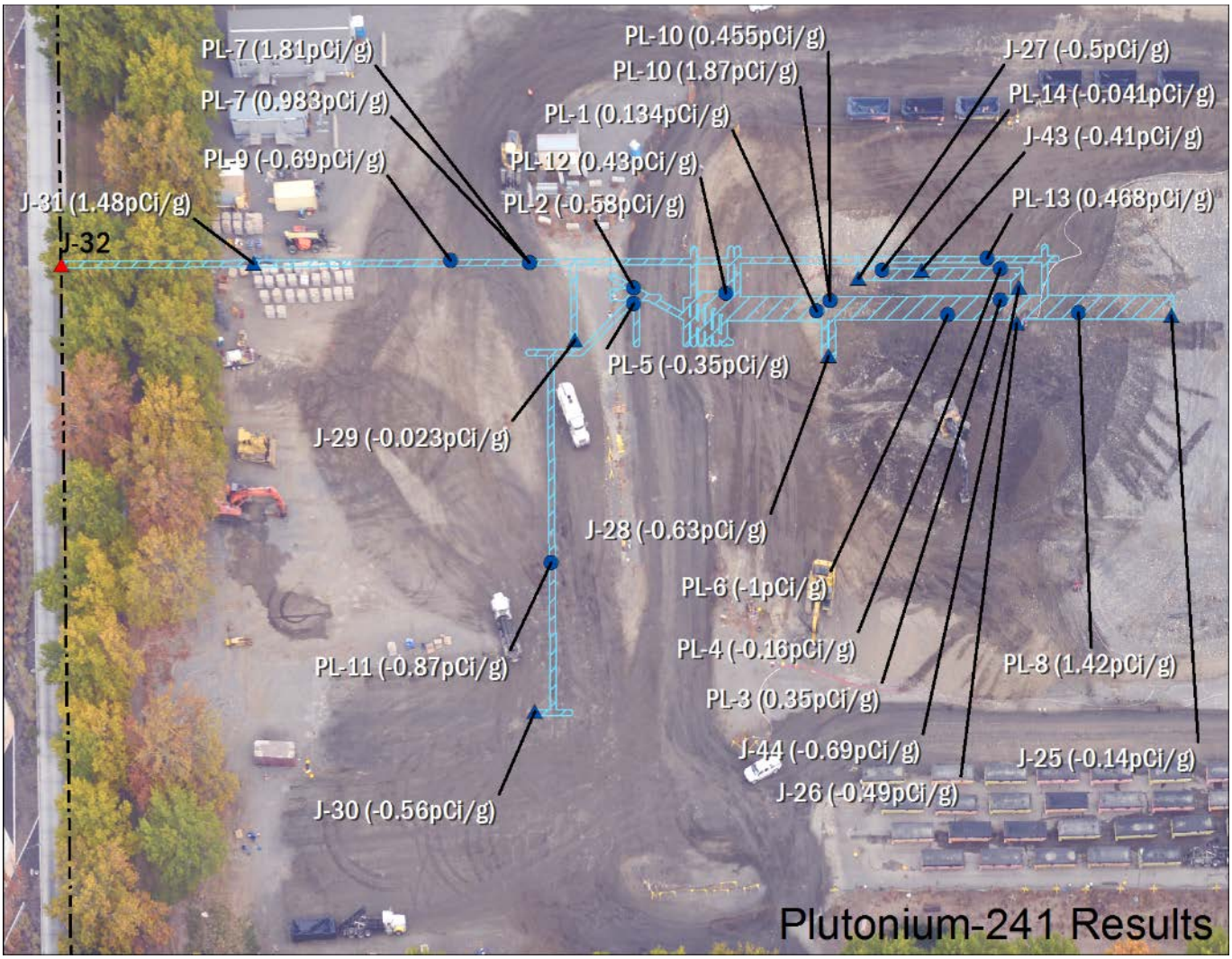

Figure C.24. Plutonium-241 results from sample locations within the pipelines survey unit

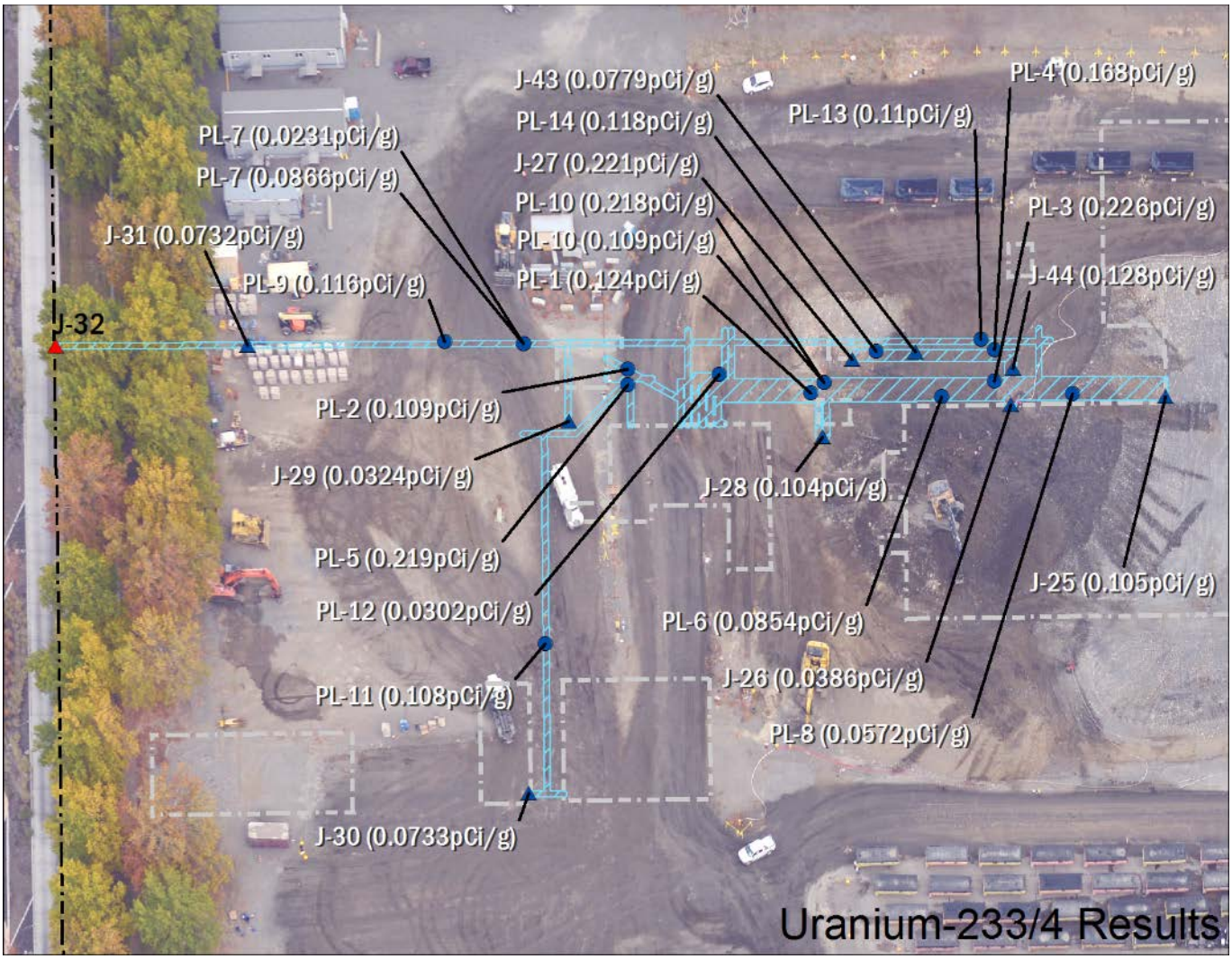

Figure C.25. Uranium-233/234 results from sample locations within the pipelines survey unit

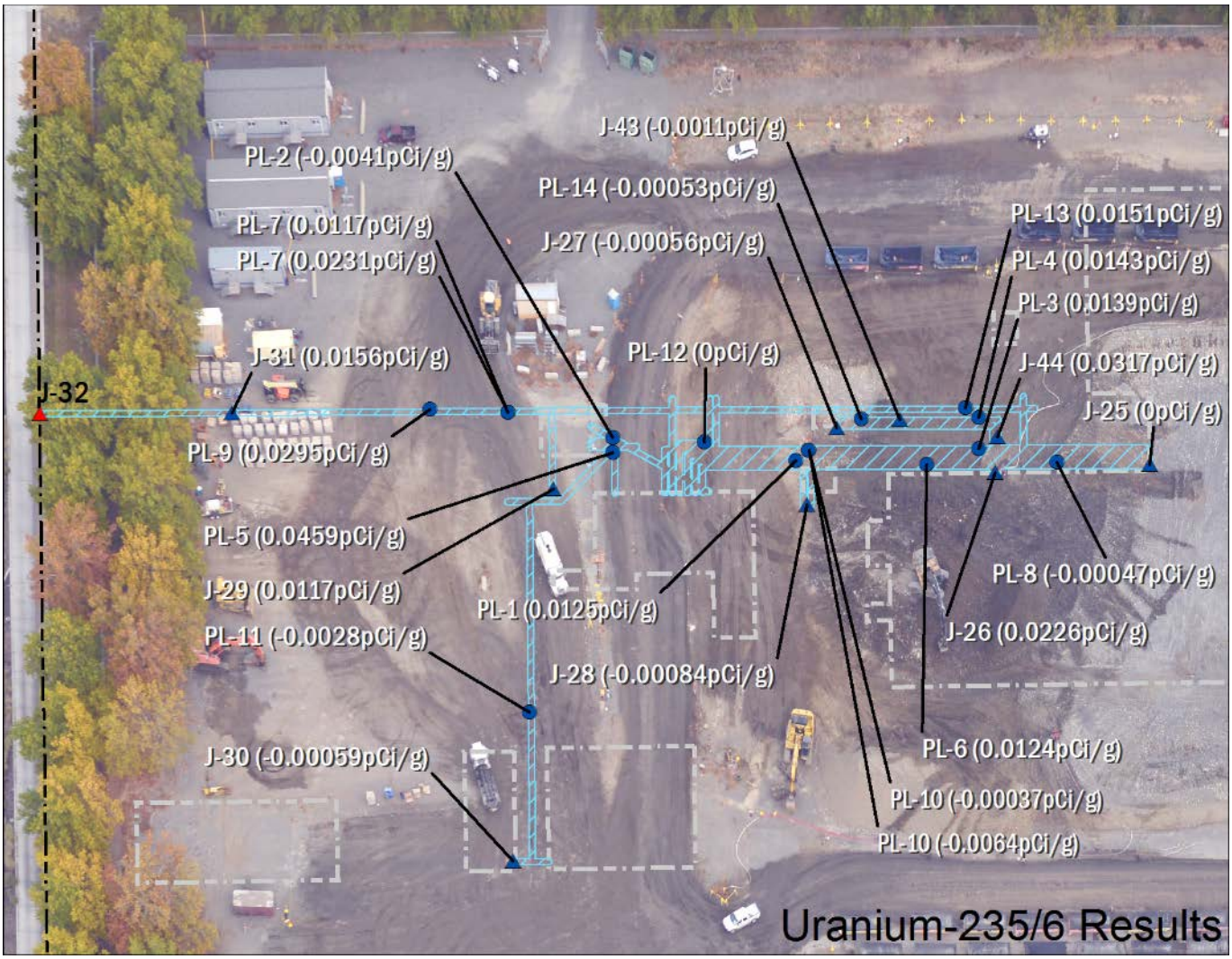

Figure C.26. Uranium-235/236 results from sample locations within the pipelines survey unit

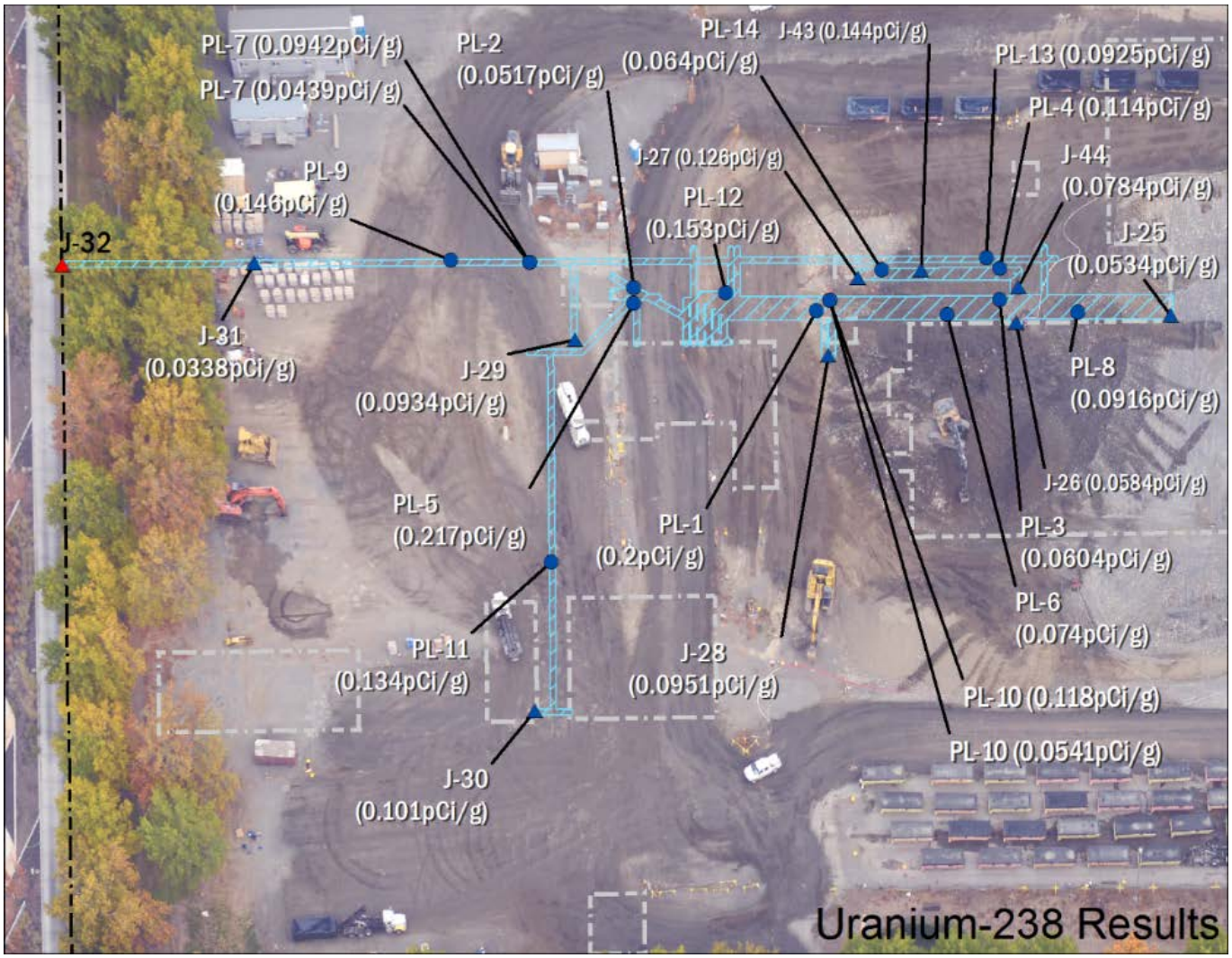

Figure C.27. Uranium-238 results from sample locations within the pipelines survey unit

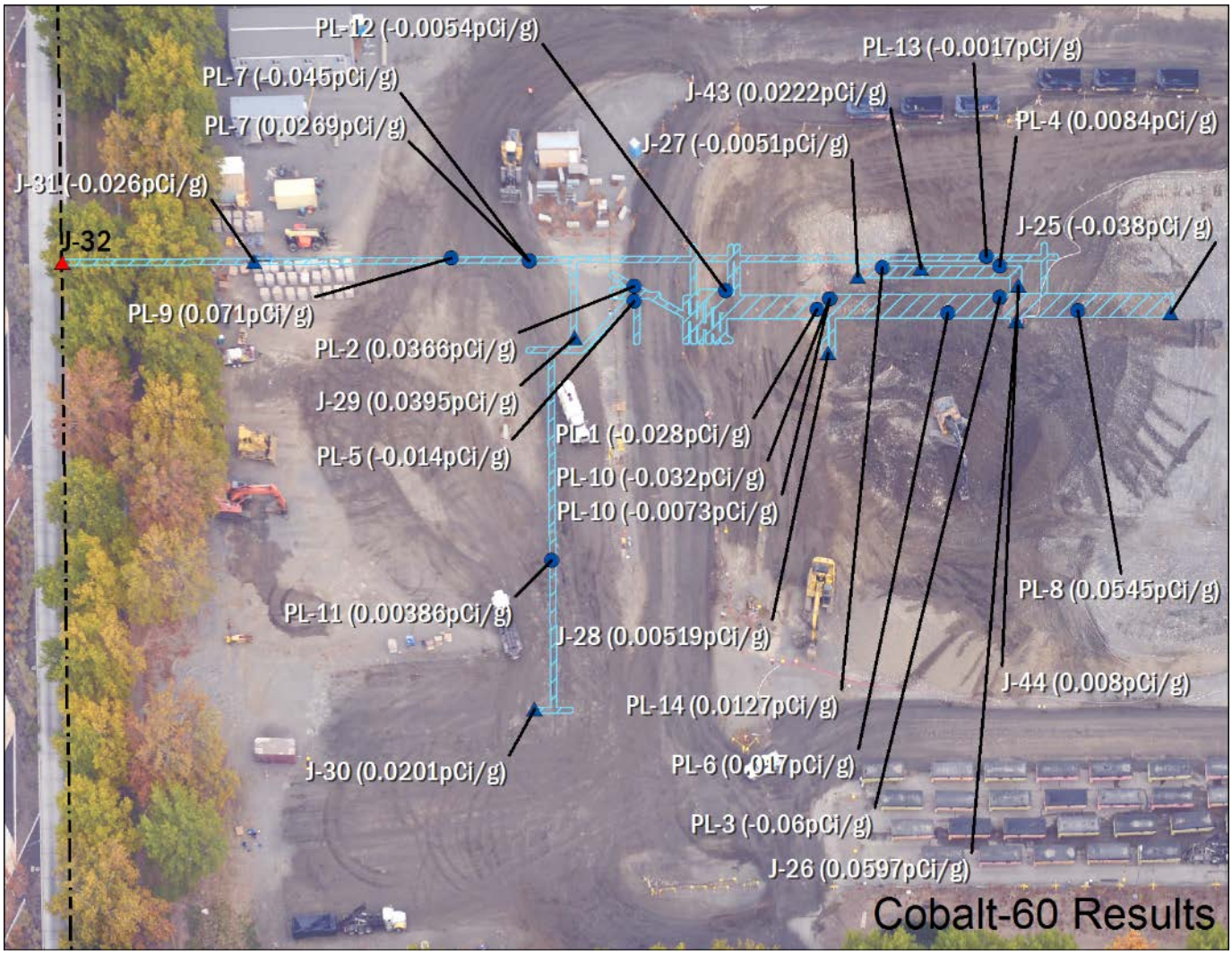

Figure C.28. Cobalt-60 results from sample locations within the pipelines survey unit

C.5 Paved Areas Survey Unit

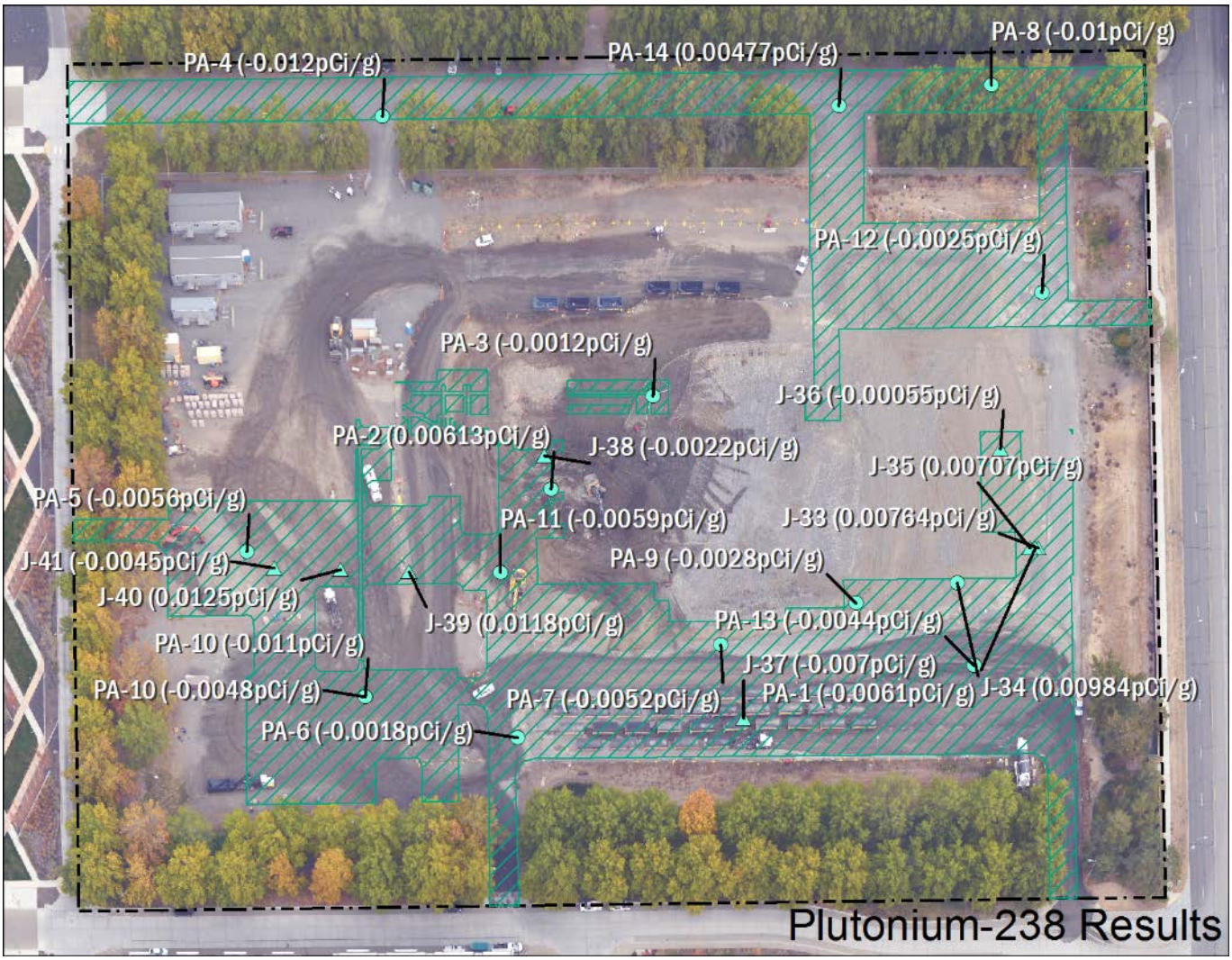

Figure C.29. Plutonium-238 results from sample locations within the paved area survey unit

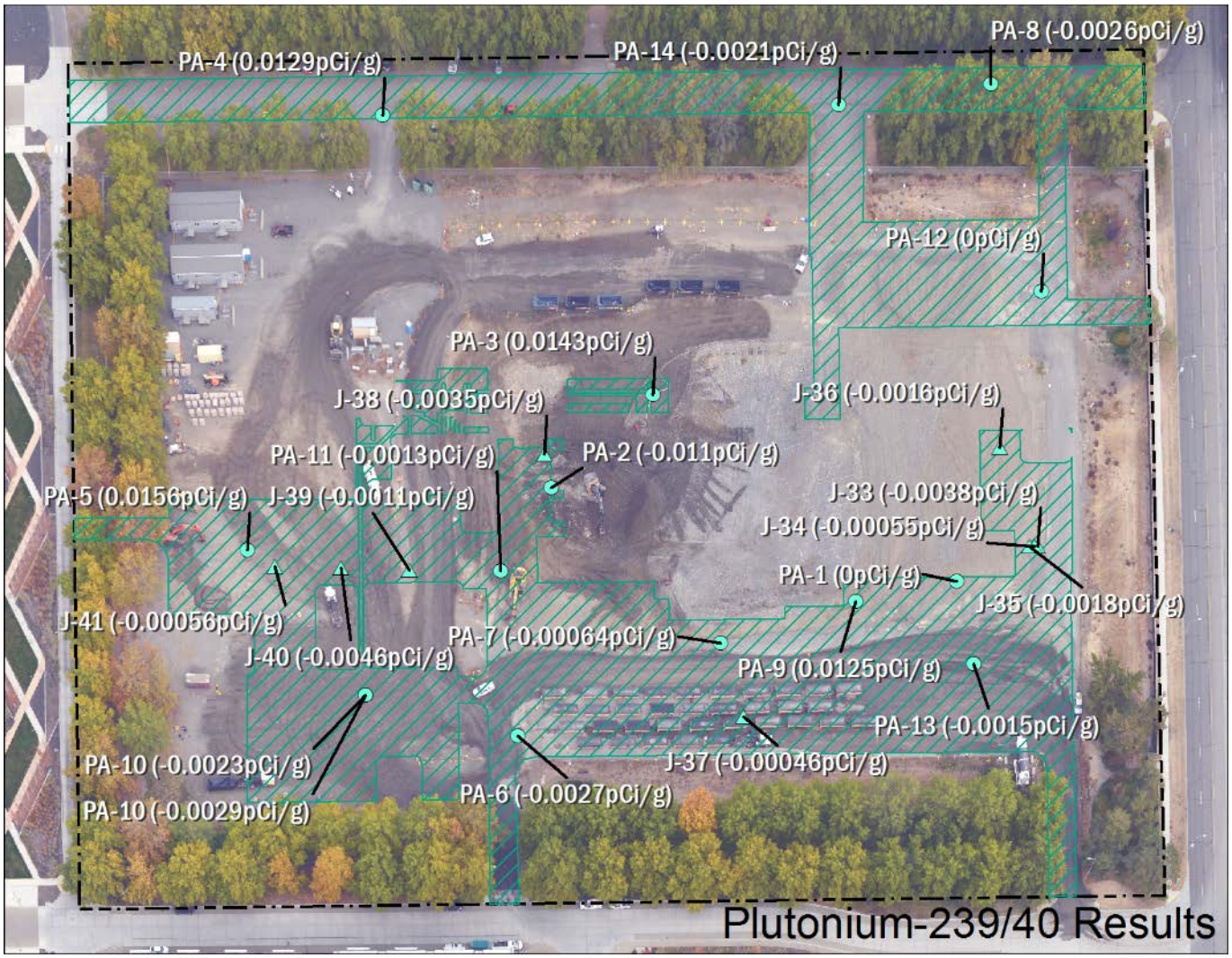

Figure C.30. Plutonium-239/240 results from sample locations within the paved area survey unit

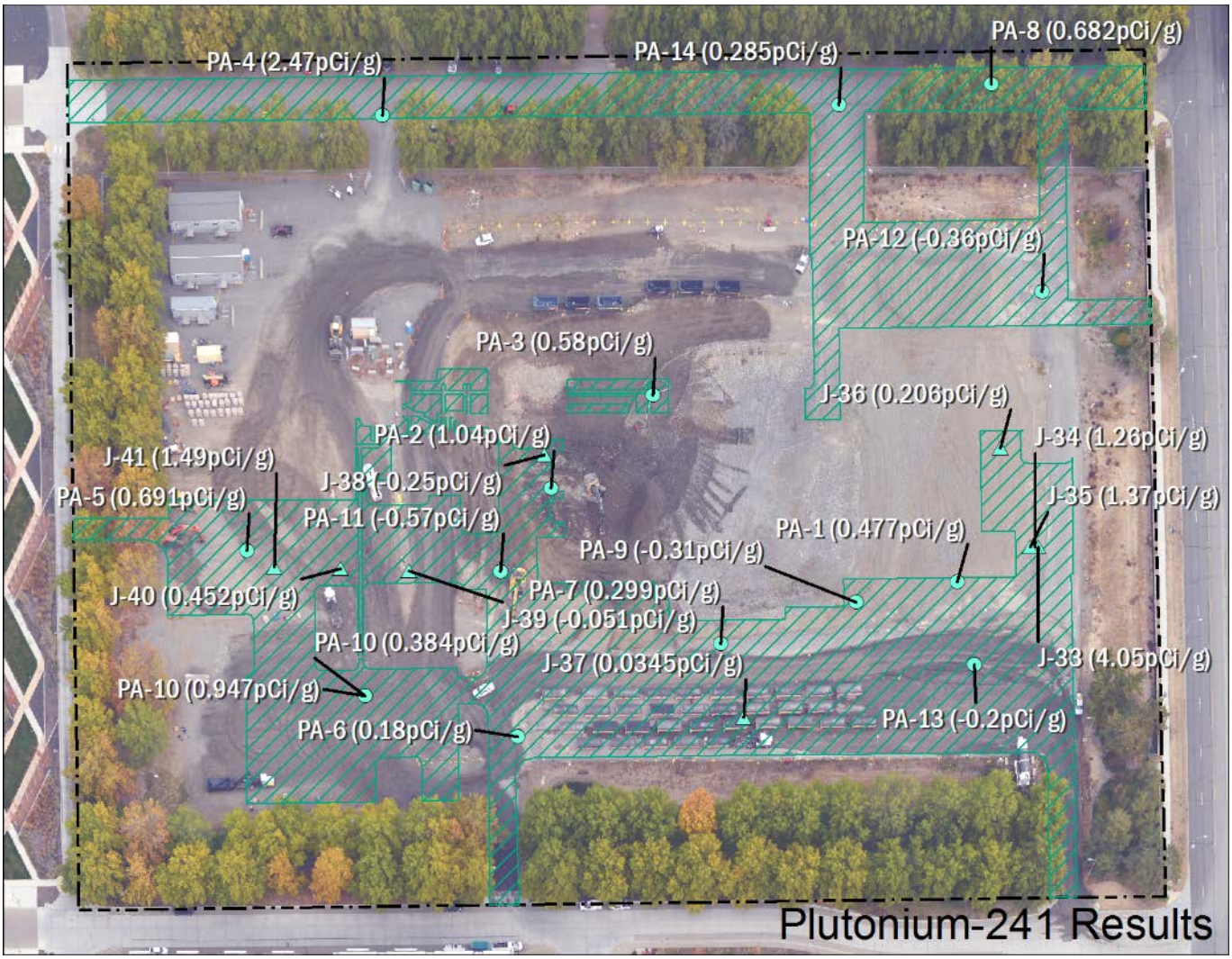

Figure C.31. Plutonium-241 results from sample locations within the paved area survey unit

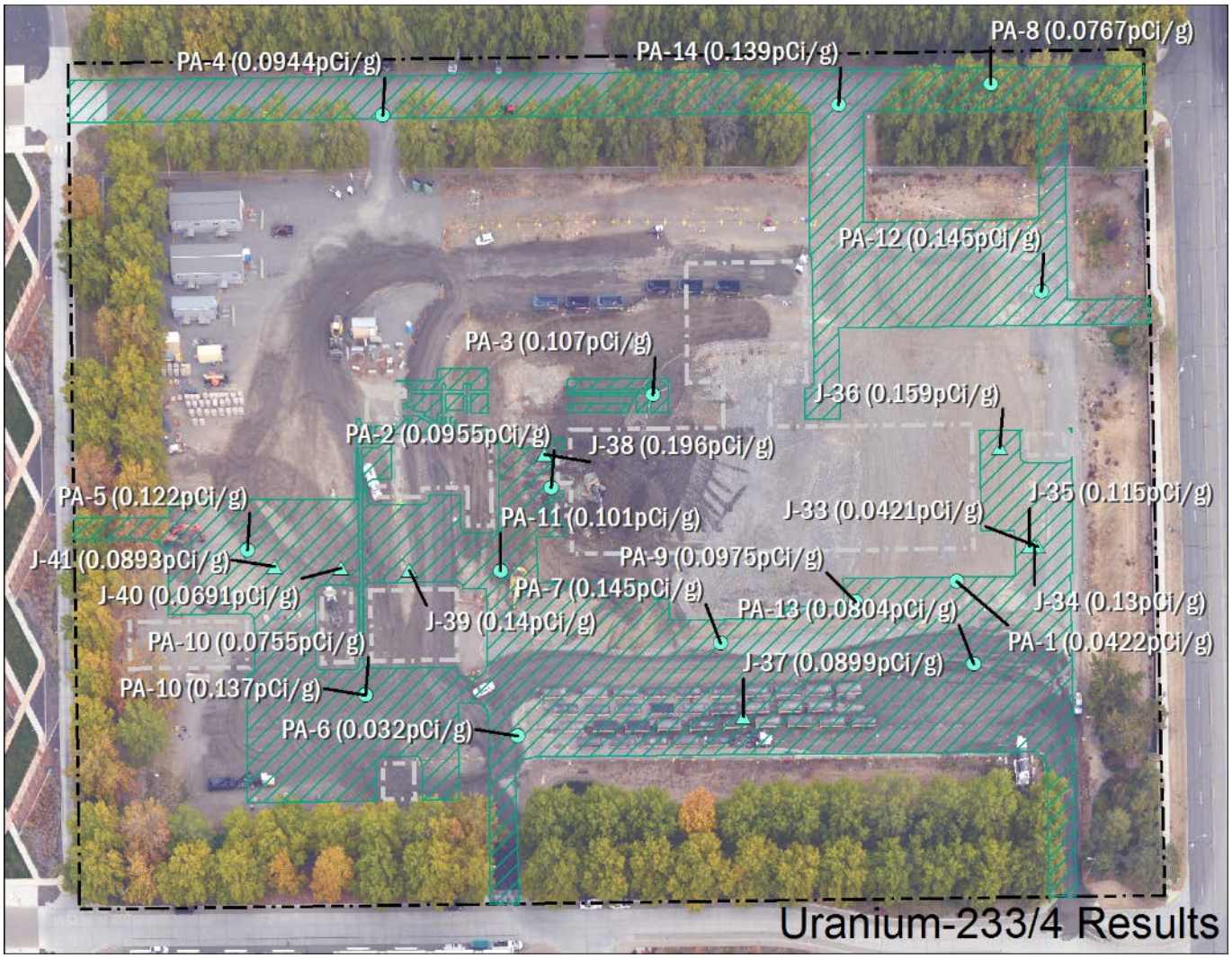

Figure C.32. Uranium-233/234 results from sample locations within the paved area survey unit

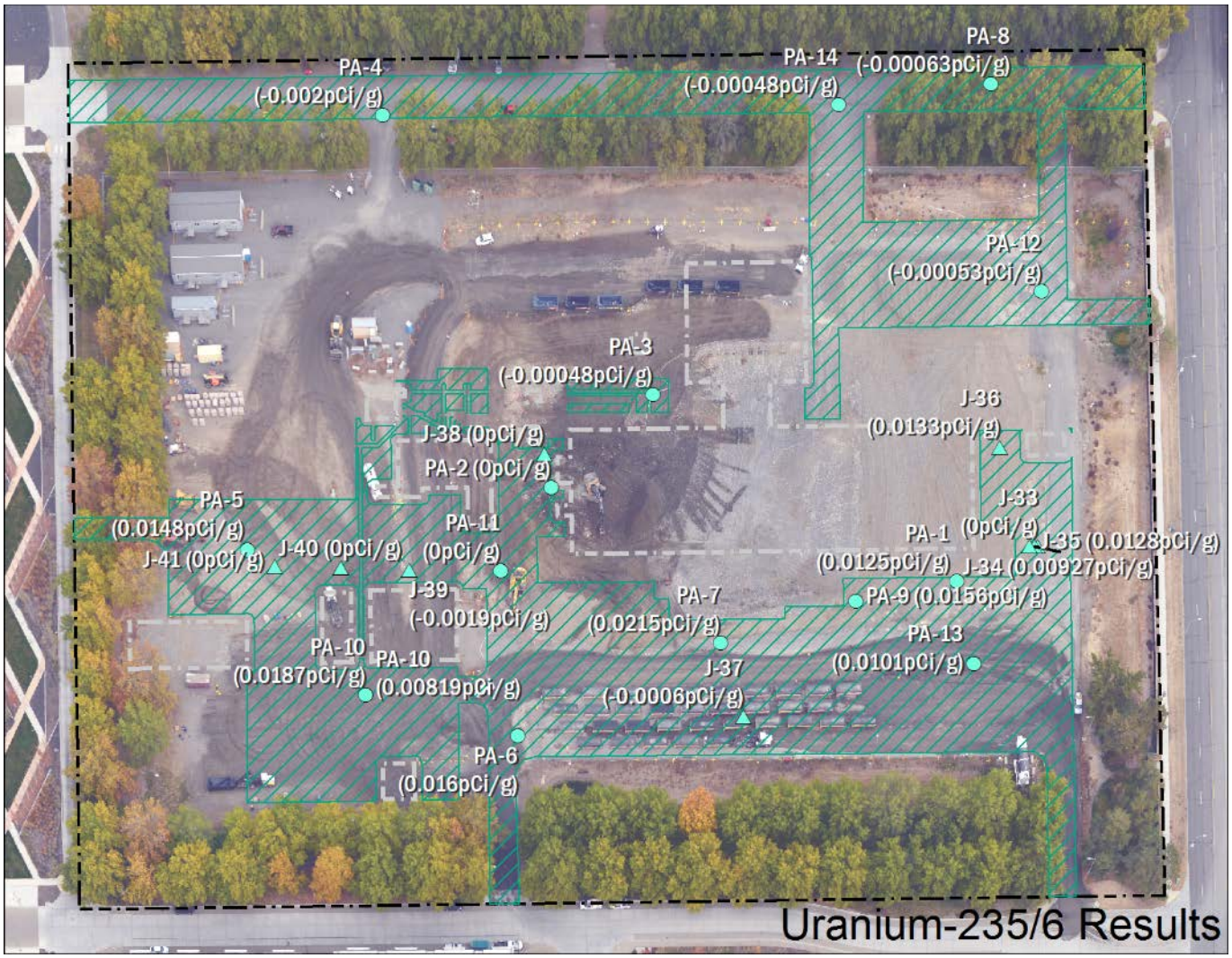

Figure C.33. Uranium-235/236 results from sample locations within the paved area survey unit

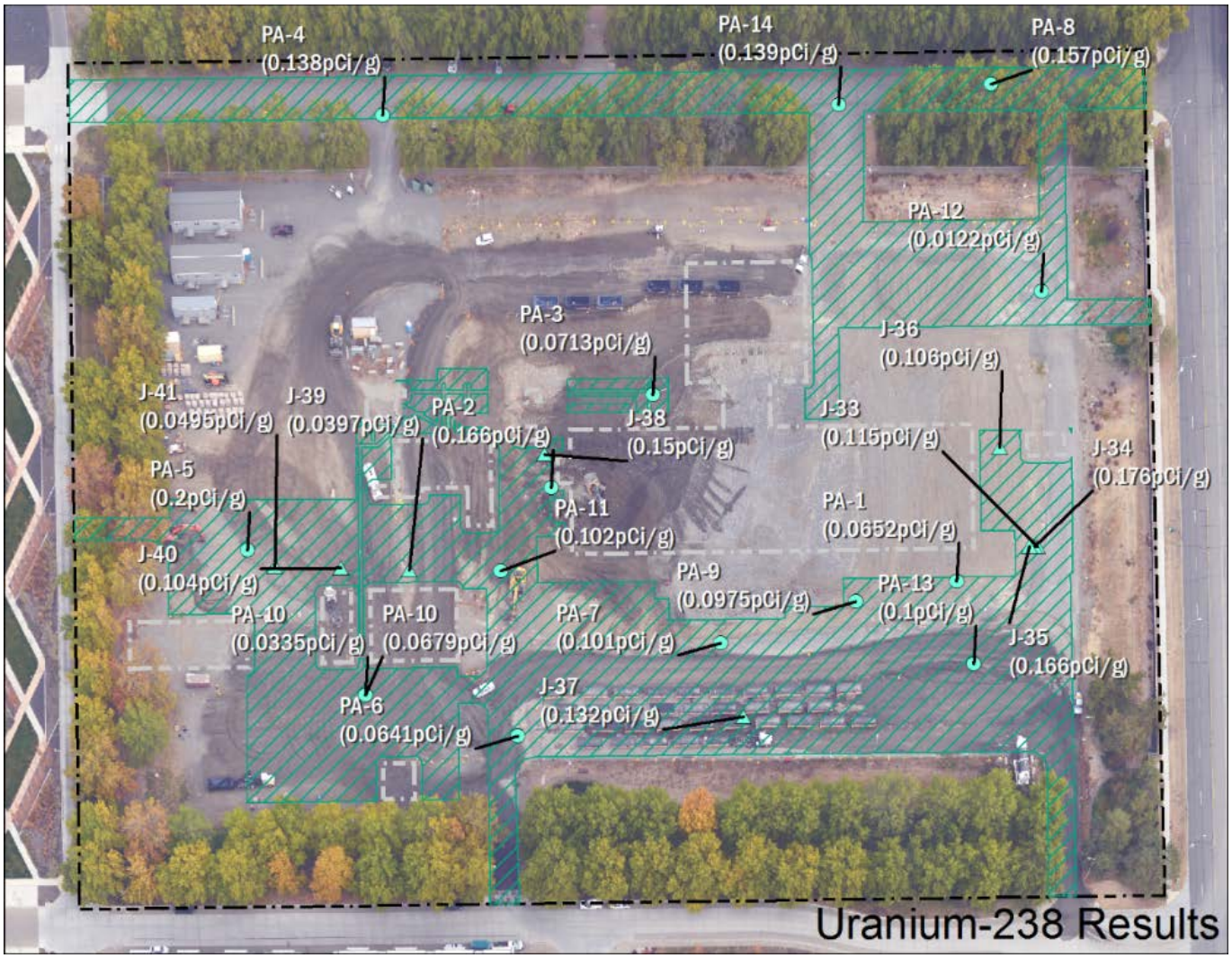

Figure C.34. Uranium-238 results from sample locations within the paved area survey unit

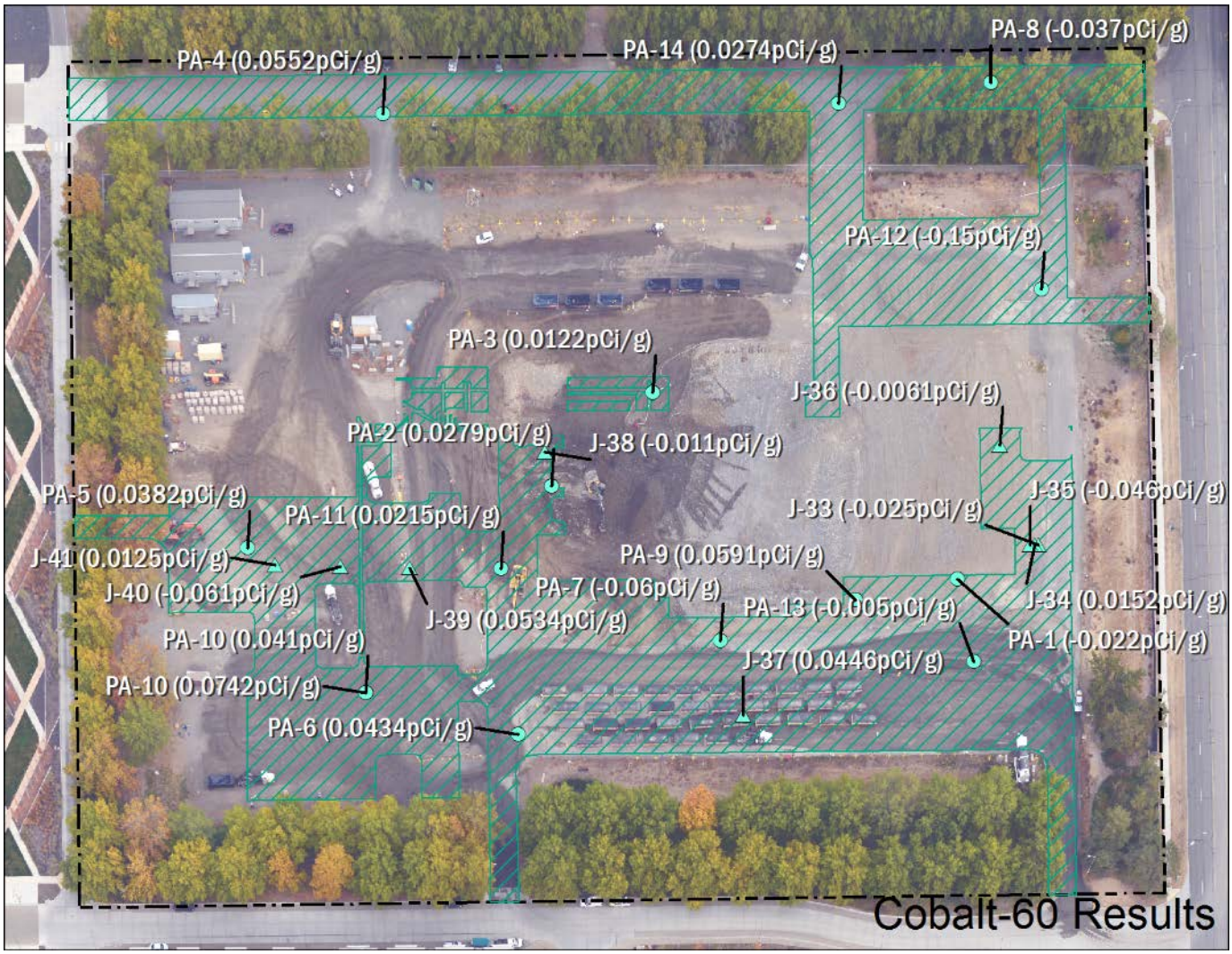

Figure C.35. Cobalt-60 results from sample locations within the paved area survey unit

C.6 Open Areas Survey Unit

Figure C.36. Plutonium-238 results from sample locations within the open areas survey unit

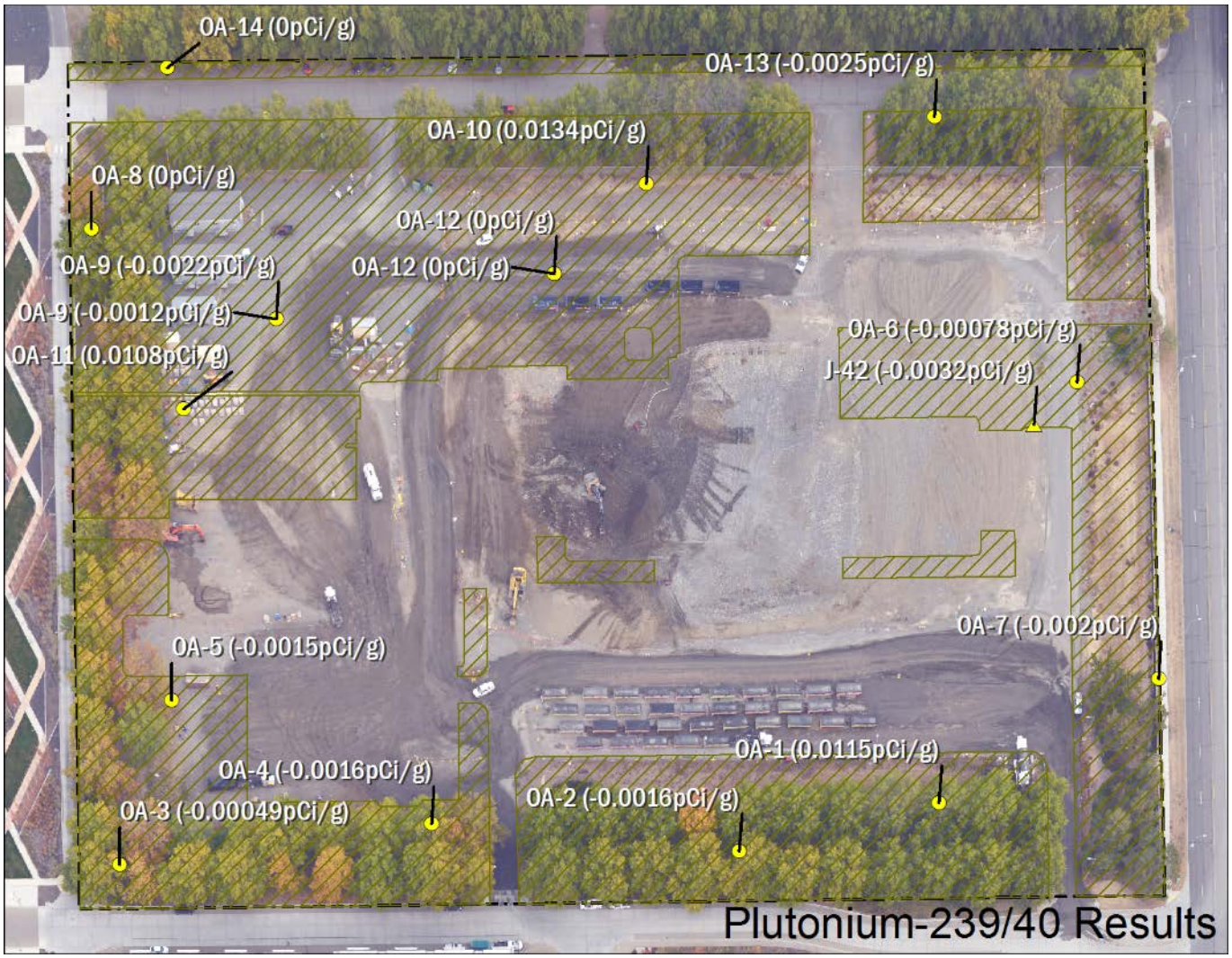

Figure C.37. Plutonium-239/240 results from sample locations within the open areas survey unit

Figure C.38. Plutonium-241 results from sample locations within the open areas survey unit

Figure C.39. Uranium-233/234 results from sample locations within the open areas survey unit

Figure C.40. Uranium-235/236 results from sample locations within the open areas survey unit

Figure C.41. Uranium-238 results from sample locations within the open areas survey unit

Figure C.42. Cobalt-60 results from sample locations within the open areas survey unit

Appendix D – Laboratory Reports

Table D.1 through Table D.6 list the unique identifiers for samples collected at each location within a survey unit. The reports from TestAmerica, Inc. (Richland, WA location) documenting the radiological analyses performance on these samples are also included within this appendix.

Table D.1. 520 building footprint survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL 520-1	B3KF97	RTL 520 J-1	B3KF69
RTL 520-2	B3KF99	RTL 520 J-2	B3KF71
RTL 520-3	B3KFB1	RTL 520 J-3	B3KF73
RTL 520-4	B3KFB3	RTL 520 J-4	B3KF75
RTL 520-5	B3KFB5	RTL 520 J-5	B3KF77
RTL 520-6	B3KFB7	RTL 520 J-6	B3KF79
RTL 520-7	B3KFB9	RTL 520 J-7	B3KF81
RTL 520-8	B3KFC1	RTL 520 J-8	B3KF83
RTL 520-9	B3KFC3	RTL 520 J-9	B3KF85
RTL 520-10	B3KFC5	RTL 520 J-10	B3KF87
RTL 520-11	B3KFC7	RTL 520 J-11	B3KF89
RTL 520-12	B3KFC9	RTL 520 J-12	B3KF91
RTL 520-13	B3KFD1	RTL 520 J-13	B3KF93
RTL 520-14	B3KFD3	RTL 520 J-14	B3KF95

Table D.2. Pipeline survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL PL-1	B3L1C3	RTL PL J-25	B3L1D7
RTL PL-2	B3L1C4	RTL PL J-26	B3L1D8
RTL PL-3	B3L1C5	RTL PL J-27	B3L1D9
RTL PL-4	B3L1C6	RTL PL J-28	B3L1F0
RTL PL-5	B3L1C7	RTL PL J-29	B3L1F1
RTL PL-6	B3L1C8	RTL PL J-30	B3L1F2
RTL PL-7	B3L1C9	RTL PL J-31	B3L1F3
RTL PL-8	B3L1D0	RTL PL J-43	B3L1F5
RTL PL-9	B3L1D1	RTL PL J-44	B3L1F6
RTL PL-10	B3L1D2	-	-
RTL PL-11	B3L1D3	-	-
RTL PL-12	B3L1D4	-	-
RTL PL-13	B3L1D5	-	-
RTL PL-14	B3L1D6	-	-

Table D.3. Tank vault and 530 building footprint survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL Vault-1	B3KL23	RTL Tank Vault and 530 J-15	B3KL20
RTL Vault-2	B3KL24	RTL Tank Vault and 530 J-16	B3KL21
RTL Vault-3	B3KL25	RTL Tank Vault and 530 J-17	B3KL22
RTL Vault-4	B3KL26	-	-
RTL Vault-5	B3KL27	-	-
RTL Vault-6	B3KL28	-	-
RTL Vault-7	B3KL29	-	-
RTL Vault-8	B3KL30	-	-
RTL Vault-9	B3KL31	-	-
RTL Vault-10	B3KL32	-	-
RTL Vault-11	B3KL33	-	-
RTL Vault-12	B3KL34	-	-
RTL Vault-13	B3KL35	-	-
RTL Vault-14	B3KL36	-	-

Table D.4. Other buildings footprint survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL OB-1	B3L265	RTL OB J-18	B3L258
RTL OB-2	B3L266	RTL OB J-19	B3L259
RTL OB-3	B3L267	RTL OB J-20	B3L260
RTL OB-4	B3L268	RTL OB J-21	B3L261
RTL OB-5	B3L269	RTL OB J-22	B3L262
RTL OB-6	B3L270	RTL OB J-23	B3L263
RTL OB-7	B3L271	RTL OB J-24	B3L264
RTL OB-8	B3L272	-	-
RTL OB-9	B3L273	-	-
RTL OB-10	B3L274	-	-
RTL OB-11	B3L275	-	-
RTL OB-12	B3L276	-	-
RTL OB-13	B3L277	-	-
RTL OB-14	B3L278	-	-

Table D.5. Paved areas survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL PA-1	B3L2D4	RTL PA J-33	B3L2F8
RTL PA-2	B3L2D5	RTL PA J-34	B3L2F9
RTL PA-3	B3L2D6	RTL PA J-35	B3L2H0
RTL PA-4	B3L2D7	RTL PA J-36	B3L2H1
RTL PA-5	B3L2D8	RTL PA J-37	B3L2H2
RTL PA-6	B3L2D9	RTL PA J-38	B3L2H3
RTL PA-7	B3L2F0	RTL PA J-39	B3L2H4
RTL PA-8	B3L2F1	RTL PA J-40	B3L2H5
RTL PA-9	B3L2F2	RTL PA J-41	B3L2H6
RTL PA-10	B3L2F3	-	-
RTL PA-11	B3L2F4	-	-
RTL PA-12	B3L2F5	-	-
RTL PA-13	B3L2F6	-	-
RTL PA-14	B3L2F7	-	-

Table D.6. Open areas survey unit sample locations and associated sample identification

Random		Specific Judgmental	
Sample Location	Sample ID	Sample Location	Sample ID
RTL OA-1	B3L2V9	RTL OA J-42	B3L2X3
RTL OA-2	B3L2W0	-	-
RTL OA-3	B3L2W1	-	-
RTL OA-4	B3L2W2	-	-
RTL OA-5	B3L2W3	-	-
RTL OA-6	B3L2W4	-	-
RTL OA-7	B3L2W5	-	-
RTL OA-8	B3L2W6	-	-
RTL OA-9	B3L2W7	-	-
RTL OA-10	B3L2W8	-	-
RTL OA-11	B3L2W9	-	-
RTL OA-12	B3L2X0	-	-
RTL OA-13	B3L2X1	-	-
RTL OA-14	B3L2X2	-	-

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8800-1
TestAmerica Sample Delivery Group: RL8800-1
Client Project/Site: F18-040

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/19/2018 12:45:43 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8800-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8800-1

Comments
No additional comments.

Receipt
The samples were received on 11/27/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: B3KF93

Lab Sample ID: 300-8800-1

Date Collected: 11/26/18 13:03
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.067	U		0.107	0.370	0.0780	pCi/g	11/27/18 16:21	12/03/18 11:15	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.010	U	0.0336	0.0336	1.00	0.0929	pCi/g	12/01/18 08:08	12/13/18 09:35	1
Pu-239/240	-0.0020	U	0.0333	0.0333	1.00	0.0690	pCi/g	12/01/18 08:08	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.2*		*30 - 105*	*12/01/18 08:08*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0204	U	0.138	0.138	1.00	0.325	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-233/234	0.149	U	0.157	0.161	1.00	0.177	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-235/236	-0.013	U	0.0790	0.0791	1.00	0.192	pCi/g	12/01/18 08:58	12/06/18 10:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*32.0*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:24*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.44	U	0.101	1.20	15.0	1.97	pCi/g	12/01/18 08:37	12/14/18 23:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*112*			*12/01/18 08:37*	*12/14/18 23:18*	*1*

Client Sample ID: B3KF99

Lab Sample ID: 300-8800-2

Date Collected: 11/26/18 09:50
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0356	U		0.0659	0.370	0.0860	pCi/g	11/27/18 16:21	12/03/18 11:16	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0061	U	0.0255	0.0255	1.00	0.0673	pCi/g	12/01/18 08:08	12/05/18 17:56	1
Pu-239/240	0.0111	U	0.0253	0.0254	1.00	0.0526	pCi/g	12/01/18 08:08	12/05/18 17:56	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KF99

Lab Sample ID: 300-8800-2
Date Collected: 11/26/18 09:50
Matrix: Solid
Date Received: 11/27/18 09:00

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	100		30 - 105	12/01/18 08:08	12/05/18 17:56	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.152**		0.0977	0.101	1.00	0.0940	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-233/234	**0.196**		0.105	0.110	1.00	0.0556	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-235/236	-0.00056	U	0.0282	0.0282	1.00	0.0517	pCi/g	12/01/18 08:58	12/06/18 10:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	82.0		30 - 105	12/01/18 08:58	12/06/18 10:25	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.941	U	0.0795	1.04	15.0	1.72	pCi/g	12/01/18 08:37	12/15/18 03:23	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	100			12/01/18 08:37	12/15/18 03:23	1

Client Sample ID: B3KF73

Lab Sample ID: 300-8800-3
Date Collected: 11/26/18 08:49
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.095	U		0.145	0.370	0.100	pCi/g	11/27/18 16:21	12/03/18 12:08	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00642	U	0.0216	0.0216	1.00	0.0548	pCi/g	12/01/18 08:08	12/05/18 17:56	1
Pu-239/240	-0.00043	U	0.0214	0.0214	1.00	0.0393	pCi/g	12/01/18 08:08	12/05/18 17:56	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	84.0		30 - 105	12/01/18 08:08	12/05/18 17:56	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.145**		0.103	0.106	1.00	0.0721	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-233/234	**0.127**		0.0967	0.0991	1.00	0.0670	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-235/236	-0.0015	U	0.0366	0.0366	1.00	0.0721	pCi/g	12/01/18 08:58	12/06/18 10:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	57.9		30 - 105	12/01/18 08:58	12/06/18 10:25	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KF73
Lab Sample ID: 300-8800-3
Date Collected: 11/26/18 08:49
Matrix: Solid
Date Received: 11/27/18 09:00

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.040	U	0.0353	0.903	15.0	1.59	pCi/g	12/01/18 08:37	12/15/18 05:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*84.0*			*12/01/18 08:37*	*12/15/18 05:25*	*1*

Client Sample ID: B3KF79
Lab Sample ID: 300-8800-4
Date Collected: 11/26/18 10:34
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0730	U		0.0545	0.370	0.0912	pCi/g	11/27/18 16:21	12/03/18 12:08	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00792	U	0.0266	0.0266	1.00	0.0676	pCi/g	12/01/18 08:08	12/05/18 17:57	1
Pu-239/240	0.0116	U	0.0265	0.0265	1.00	0.0549	pCi/g	12/01/18 08:08	12/05/18 17:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*86.8*		*30 - 105*	*12/01/18 08:08*	*12/05/18 17:57*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.101**		0.0784	0.0802	1.00	0.0643	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-233/234	**0.117**		0.0838	0.0860	1.00	0.0585	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-235/236	-0.00059	U	0.0296	0.0296	1.00	0.0544	pCi/g	12/01/18 08:58	12/06/18 10:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*63.0*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:25*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.191	U	0.0319	1.05	15.0	1.83	pCi/g	12/01/18 08:37	12/15/18 07:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.8*			*12/01/18 08:37*	*12/15/18 07:27*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KF75

Lab Sample ID: 300-8800-5
Date Collected: 11/26/18 09:28
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.048	U		0.104	0.370	0.0778	pCi/g	11/27/18 16:21	12/03/18 12:08	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00755	U	0.0293	0.0293	1.00	0.0773	pCi/g	12/01/18 08:08	12/13/18 09:35	1
Pu-239/240	0.000	U	0.0290	0.0290	1.00	0.0532	pCi/g	12/01/18 08:08	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.5*		*30 - 105*	*12/01/18 08:08*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.129**		0.0955	0.0978	1.00	0.112	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-233/234	**0.0700**		0.0642	0.0652	1.00	0.0597	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-235/236	-0.0011	U	0.0287	0.0287	1.00	0.0567	pCi/g	12/01/18 08:58	12/06/18 10:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.6*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:25*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.563	U	0.0495	1.17	15.0	2.02	pCi/g	12/01/18 08:37	12/15/18 09:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*106*			*12/01/18 08:37*	*12/15/18 09:30*	*1*

Client Sample ID: B3KFB7

Lab Sample ID: 300-8800-6
Date Collected: 11/26/18 13:26
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0489	U		0.0471	0.370	0.0811	pCi/g	11/27/18 16:21	12/03/18 12:09	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0043	U	0.0268	0.0268	1.00	0.0652	pCi/g	12/01/18 08:08	12/05/18 17:57	1
Pu-239/240	-0.00053	U	0.0266	0.0266	1.00	0.0489	pCi/g	12/01/18 08:08	12/05/18 17:57	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KFB7
Date Collected: 11/26/18 13:26
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-6
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	97.6		30 - 105	12/01/18 08:08	12/05/18 17:57	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0937		0.0636	0.0652	1.00	0.0460	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-233/234	0.0840		0.0600	0.0613	1.00	0.0419	pCi/g	12/01/18 08:58	12/06/18 10:25	1
U-235/236	-0.00042	U	0.0212	0.0212	1.00	0.0389	pCi/g	12/01/18 08:58	12/06/18 10:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	95.9		30 - 105	12/01/18 08:58	12/06/18 10:25	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.370	U	0.0655	1.12	15.0	1.92	pCi/g	12/01/18 08:37	12/15/18 11:32	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	97.6			12/01/18 08:37	12/15/18 11:32	1

Client Sample ID: B3KF95
Date Collected: 11/26/18 13:18
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0793	U		0.0560	0.370	0.0974	pCi/g	11/27/18 16:21	12/03/18 12:09	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0189	U	0.0435	0.0436	1.00	0.0905	pCi/g	12/01/18 08:08	12/05/18 17:58	1
Pu-239/240	-0.0012	U	0.0306	0.0306	1.00	0.0603	pCi/g	12/01/18 08:08	12/05/18 17:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	67.2		30 - 105	12/01/18 08:08	12/05/18 17:58	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.144		0.0969	0.0997	1.00	0.0638	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	0.110		0.0855	0.0874	1.00	0.0701	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	0.000	U	0.0323	0.0323	1.00	0.0593	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	74.6		30 - 105	12/01/18 08:58	12/06/18 10:26	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KF95
Lab Sample ID: 300-8800-7
Date Collected: 11/26/18 13:18
Matrix: Solid
Date Received: 11/27/18 09:00

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.258	U	0.0499	1.27	15.0	2.20	pCi/g	12/01/18 08:37	12/15/18 13:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*67.2*			*12/01/18 08:37*	*12/15/18 13:34*	*1*

Client Sample ID: B3KF77
Lab Sample ID: 300-8800-8
Date Collected: 11/26/18 11:05
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0300	U		0.0861	0.370	0.0962	pCi/g	11/27/18 16:21	12/04/18 09:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.012	U	0.0253	0.0253	1.00	0.0780	pCi/g	12/01/18 08:08	12/05/18 17:58	1
Pu-239/240	-0.0015	U	0.0249	0.0249	1.00	0.0516	pCi/g	12/01/18 08:08	12/05/18 17:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.6*		*30 - 105*	*12/01/18 08:08*	*12/05/18 17:58*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.157**		0.0993	0.103	1.00	0.0576	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.171**		0.104	0.108	1.00	0.0620	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	0.0144	U	0.0315	0.0315	1.00	0.0620	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*79.4*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.509	U	0.0388	1.07	15.0	1.83	pCi/g	12/01/18 08:37	12/15/18 15:36	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.6*			*12/01/18 08:37*	*12/15/18 15:36*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KFD1
Date Collected: 11/26/18 11:48
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-9
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0288	U		0.0736	0.370	0.0861	pCi/g	11/27/18 16:21	12/04/18 09:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0173	U	0.0333	0.0334	1.00	0.0635	pCi/g	12/01/18 08:08	12/05/18 17:58	1
Pu-239/240	-0.0047	U	0.0236	0.0236	1.00	0.0600	pCi/g	12/01/18 08:08	12/05/18 17:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*92.1*		*30 - 105*	*12/01/18 08:08*	*12/05/18 17:58*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.111**		0.0702	0.0723	1.00	0.0408	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.143**		0.0801	0.0830	1.00	0.0462	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	0.0111	U	0.0222	0.0223	1.00	0.0408	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*89.5*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.317	U	0.0311	0.912	15.0	1.57	pCi/g	12/01/18 08:37	12/15/18 19:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*92.1*			*12/01/18 08:37*	*12/15/18 19:41*	*1*

Client Sample ID: B3KFD3
Date Collected: 11/26/18 12:25
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00714	U		0.0699	0.370	0.0771	pCi/g	11/27/18 16:21	12/04/18 09:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00728	U	0.0283	0.0283	1.00	0.0745	pCi/g	12/01/18 08:08	12/05/18 17:59	1
Pu-239/240	-0.0017	U	0.0281	0.0281	1.00	0.0583	pCi/g	12/01/18 08:08	12/05/18 17:59	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KFD3

Lab Sample ID: 300-8800-10
Date Collected: 11/26/18 12:25
Matrix: Solid
Date Received: 11/27/18 09:00

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	96.8		30 - 105	12/01/18 08:08	12/05/18 17:59	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.127**		0.0806	0.0831	1.00	0.0468	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.124**		0.0806	0.0831	1.00	0.0592	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	0.0255	U	0.0361	0.0363	1.00	0.0468	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	84.2		30 - 105	12/01/18 08:58	12/06/18 10:26	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.788	U	0.0802	1.18	15.0	1.99	pCi/g	12/01/18 08:37	12/15/18 21:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	96.8			12/01/18 08:37	12/15/18 21:43	1

Client Sample ID: B3KF81

Lab Sample ID: 300-8800-11
Date Collected: 11/26/18 10:22
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.027	U		0.0882	0.370	0.0786	pCi/g	11/27/18 16:21	12/04/18 09:23	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0079	U	0.0285	0.0285	1.00	0.0777	pCi/g	12/01/18 08:08	12/05/18 17:59	1
Pu-239/240	-0.00056	U	0.0282	0.0282	1.00	0.0518	pCi/g	12/01/18 08:08	12/05/18 17:59	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	86.5		30 - 105	12/01/18 08:08	12/05/18 17:59	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.100**		0.0678	0.0695	1.00	0.0470	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.0560**		0.0505	0.0512	1.00	0.0415	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	-0.00045	U	0.0226	0.0226	1.00	0.0415	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	94.5		30 - 105	12/01/18 08:58	12/06/18 10:26	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KF81
Date Collected: 11/26/18 10:22
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-11
Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.719	U	0.0656	1.25	15.0	2.12	pCi/g	12/01/18 08:37	12/15/18 23:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.5*			*12/01/18 08:37*	*12/15/18 23:46*	*1*

Client Sample ID: B3KF83
Date Collected: 11/26/18 11:25
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-12
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0142	U		0.0822	0.370	0.0891	pCi/g	11/27/18 16:21	12/04/18 09:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00052	U	0.0260	0.0260	1.00	0.0477	pCi/g	12/01/18 08:08	12/05/18 18:00	1
Pu-239/240	-0.0010	U	0.0260	0.0260	1.00	0.0513	pCi/g	12/01/18 08:08	12/05/18 18:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.2*		*30 - 105*	*12/01/18 08:08*	*12/05/18 18:00*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.199**		0.0938	0.0987	1.00	0.0406	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.154**		0.0827	0.0861	1.00	0.0406	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	0.000	U	0.0221	0.0221	1.00	0.0406	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*93.1*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.540	U	0.0512	1.11	15.0	1.89	pCi/g	12/01/18 08:37	12/16/18 01:48	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.2*			*12/01/18 08:37*	*12/16/18 01:48*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3L185

Lab Sample ID: 300-8800-13

Date Collected: 11/26/18 11:48
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0239	U		0.0956	0.370	0.103	pCi/g	11/27/18 16:21	12/04/18 10:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0073	U	0.0282	0.0283	1.00	0.0757	pCi/g	12/01/18 08:08	12/13/18 09:36	1
Pu-239/240	-0.00056	U	0.0280	0.0280	1.00	0.0513	pCi/g	12/01/18 08:08	12/13/18 09:36	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*93.7*		*30 - 105*	*12/01/18 08:08*	*12/13/18 09:36*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0729**		0.0595	0.0605	1.00	0.0446	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-233/234	**0.119**		0.0768	0.0790	1.00	0.0547	pCi/g	12/01/18 08:58	12/06/18 10:26	1
U-235/236	-0.00049	U	0.0243	0.0243	1.00	0.0446	pCi/g	12/01/18 08:58	12/06/18 10:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*92.3*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.862	U	0.0563	1.13	15.0	1.91	pCi/g	12/01/18 08:37	12/16/18 03:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*109*			*12/01/18 08:37*	*12/16/18 03:50*	*1*

Client Sample ID: B3KFC1

Lab Sample ID: 300-8800-14

Date Collected: 11/26/18 12:14
Matrix: Solid
Date Received: 11/27/18 09:00

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.060	U		0.0935	0.370	0.0627	pCi/g	11/27/18 16:21	12/04/18 10:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0118	U	0.0295	0.0296	1.00	0.0697	pCi/g	12/01/18 08:08	12/06/18 10:10	1
Pu-239/240	-0.0047	U	0.0296	0.0296	1.00	0.0759	pCi/g	12/01/18 08:08	12/06/18 10:10	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KFC1
Date Collected: 11/26/18 12:14
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-14
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	105		30 - 105	12/01/18 08:08	12/06/18 10:10	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.145**		0.0839	0.0868	1.00	0.0445	pCi/g	12/01/18 08:58	12/06/18 10:27	1
U-233/234	**0.193**		0.0969	0.101	1.00	0.0445	pCi/g	12/01/18 08:58	12/06/18 10:27	1
U-235/236	0.000	U	0.0243	0.0243	1.00	0.0445	pCi/g	12/01/18 08:58	12/06/18 10:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	93.0		30 - 105	12/01/18 08:58	12/06/18 10:27	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.595	U	0.0897	1.13	15.0	1.90	pCi/g	12/01/18 08:37	12/16/18 05:53	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	105			12/01/18 08:37	12/16/18 05:53	1

Client Sample ID: B3KFB9
Date Collected: 11/26/18 12:41
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-15
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.043	U		0.116	0.370	0.101	pCi/g	11/27/18 16:21	12/04/18 10:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0023	U	0.0189	0.0189	1.00	0.0438	pCi/g	12/01/18 08:08	12/06/18 10:11	1
Pu-239/240	0.00678	U	0.0190	0.0190	1.00	0.0450	pCi/g	12/01/18 08:08	12/06/18 10:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	94.3		30 - 105	12/01/18 08:08	12/06/18 10:11	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.205**		0.106	0.111	1.00	0.0504	pCi/g	12/01/18 08:58	12/06/18 10:27	1
U-233/234	**0.0813**		0.0673	0.0685	1.00	0.0542	pCi/g	12/01/18 08:58	12/06/18 10:27	1
U-235/236	0.000	U	0.0275	0.0275	1.00	0.0504	pCi/g	12/01/18 08:58	12/06/18 10:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	80.3		30 - 105	12/01/18 08:58	12/06/18 10:27	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3KFB9

Date Collected: 11/26/18 12:41
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8800-15

Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.730	U	0.0718	0.821	15.0	1.36	pCi/g	12/01/18 08:37	12/16/18 07:55	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.3*			*12/01/18 08:37*	*12/16/18 07:55*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8800-1	B3KF93	88.2
300-8800-1 DU	B3KF93	88.0
300-8800-2	B3KF99	100
300-8800-3	B3KF73	84.0
300-8800-4	B3KF79	86.8
300-8800-5	B3KF75	91.5
300-8800-6	B3KFB7	97.6
300-8800-7	B3KF95	67.2
300-8800-8	B3KF77	95.6
300-8800-9	B3KFD1	92.1
300-8800-10	B3KFD3	96.8
300-8800-11	B3KF81	86.5
300-8800-12	B3KF83	88.2
300-8800-13	B3L185	93.7
300-8800-14	B3KFC1	105
300-8800-15	B3KFB9	94.3
LCS 300-16282/2-B	Lab Control Sample	89.2
MB 300-16282/1-B	Method Blank	82.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8800-1	B3KF93	32.0
300-8800-1 DU	B3KF93	43.7
300-8800-2	B3KF99	82.0
300-8800-3	B3KF73	57.9
300-8800-4	B3KF79	63.0
300-8800-5	B3KF75	81.6
300-8800-6	B3KFB7	95.9
300-8800-7	B3KF95	74.6
300-8800-8	B3KF77	79.4
300-8800-9	B3KFD1	89.5
300-8800-10	B3KFD3	84.2
300-8800-11	B3KF81	94.5
300-8800-12	B3KF83	93.1
300-8800-13	B3L185	92.3
300-8800-14	B3KFC1	93.0
300-8800-15	B3KFB9	80.3
LCS 300-16284/2-A	Lab Control Sample	83.4
MB 300-16284/1-A	Method Blank	60.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8800-1	B3KF93	112							
300-8800-1 DU	B3KF93	107							
300-8800-2	B3KF99	100							
300-8800-3	B3KF73	84.0							
300-8800-4	B3KF79	86.8							
300-8800-5	B3KF75	106							
300-8800-6	B3KFB7	97.6							
300-8800-7	B3KF95	67.2							
300-8800-8	B3KF77	95.6							
300-8800-9	B3KFD1	92.1							
300-8800-10	B3KFD3	96.8							
300-8800-11	B3KF81	86.5							
300-8800-12	B3KF83	88.2							
300-8800-13	B3L185	109							
300-8800-14	B3KFC1	105							
300-8800-15	B3KFB9	94.3							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16140/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0130	U		0.0606	0.370	0.0711	pCi/g	11/27/18 16:21	12/03/18 11:14	1

Lab Sample ID: LCS 300-16140/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.64	2.474		0.190	0.370	0.0970	pCi/g	94	80 - 120

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.067	U	0.00959	U y	0.0789	0.370	0.0851	pCi/g	267	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16284/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16430 — **Prep Batch: 16284**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.00919	U	0.0357	0.0357	1.00	0.0941	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-233/234	-0.00353	U	0.0355	0.0355	1.00	0.0795	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-235/236	-0.00141	U	0.0354	0.0354	1.00	0.0698	pCi/g	12/01/18 08:58	12/06/18 10:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*60.5*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:24*	*1*

Lab Sample ID: LCS 300-16284/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16430 — **Prep Batch: 16284**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.88	3.351		0.706	1.00	0.0802	pCi/g	86	80 - 120
U-233/234	3.70	3.090		0.663	1.00	0.0782	pCi/g	83	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*83.4*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16430 — **Prep Batch: 16284**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0204	U		0.0721	U y	0.0944	1.00	0.132	pCi/g			112	30
U-233/234	0.149	U		0.184		0.147	1.00	0.117	pCi/g			21	30
U-235/236	-0.013	U		-0.00108	U y	0.0538	1.00	0.0987	pCi/g			168	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*43.7*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16282/1-B — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16413 — **Prep Batch: 16282**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0206	U	0.0430	0.0432	1.00	0.0859	pCi/g	12/01/18 08:08	12/13/18 09:35	1
Pu-239/240	-0.00242	U	0.0303	0.0303	1.00	0.0656	pCi/g	12/01/18 08:08	12/13/18 09:35	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*82.6*		*30 - 105*	*12/01/18 08:08*	*12/13/18 09:35*	*1*

Lab Sample ID: LCS 300-16282/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16413 — **Prep Batch: 16282**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.44	3.854		0.771	1.00	0.0637	pCi/g	87	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*89.2*		*30 - 105*

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16413 — **Prep Batch: 16282**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.010	U		0.00325	U y	0.0206	1.00	0.0586	pCi/g			394	30
Pu-239/240	-0.0020	U		-0.00163	U	0.0204	1.00	0.0441	pCi/g			20	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*88.0*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16283/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.506	U	0.0399	1.04	15.0	1.79	pCi/g	12/01/18 08:37	12/14/18 19:13	1

Lab Sample ID: LCS 300-16283/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			212	220.0		14.0	15.0	1.92	pCi/g	104	80 - 120		

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.44	U		1.026	U y	0.821	15.0	1.34	pCi/g			33	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*107*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

General Chemistry

Analysis Batch: 16141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-1	B3KF93	Total/NA	Solid	Moisture	
300-8800-2	B3KF99	Total/NA	Solid	Moisture	
300-8800-3	B3KF73	Total/NA	Solid	Moisture	
300-8800-4	B3KF79	Total/NA	Solid	Moisture	
300-8800-5	B3KF75	Total/NA	Solid	Moisture	
300-8800-6	B3KFB7	Total/NA	Solid	Moisture	
300-8800-7	B3KF95	Total/NA	Solid	Moisture	
300-8800-8	B3KF77	Total/NA	Solid	Moisture	
300-8800-9	B3KFD1	Total/NA	Solid	Moisture	
300-8800-10	B3KFD3	Total/NA	Solid	Moisture	
300-8800-11	B3KF81	Total/NA	Solid	Moisture	
300-8800-12	B3KF83	Total/NA	Solid	Moisture	
300-8800-13	B3L185	Total/NA	Solid	Moisture	
300-8800-14	B3KFC1	Total/NA	Solid	Moisture	
300-8800-15	B3KFB9	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-1	B3KF93	Total/NA	Solid	Direct Addition	
300-8800-2	B3KF99	Total/NA	Solid	Direct Addition	
300-8800-3	B3KF73	Total/NA	Solid	Direct Addition	
300-8800-4	B3KF79	Total/NA	Solid	Direct Addition	
300-8800-5	B3KF75	Total/NA	Solid	Direct Addition	
300-8800-6	B3KFB7	Total/NA	Solid	Direct Addition	
300-8800-7	B3KF95	Total/NA	Solid	Direct Addition	
300-8800-8	B3KF77	Total/NA	Solid	Direct Addition	
300-8800-9	B3KFD1	Total/NA	Solid	Direct Addition	
300-8800-10	B3KFD3	Total/NA	Solid	Direct Addition	
300-8800-11	B3KF81	Total/NA	Solid	Direct Addition	
300-8800-12	B3KF83	Total/NA	Solid	Direct Addition	
300-8800-13	B3L185	Total/NA	Solid	Direct Addition	
300-8800-14	B3KFC1	Total/NA	Solid	Direct Addition	
300-8800-15	B3KFB9	Total/NA	Solid	Direct Addition	
MB 300-16140/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16140/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8800-1 DU	B3KF93	Total/NA	Solid	Direct Addition	

Prep Batch: 16282

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-1	B3KF93	Total/NA	Solid	ExtChrAct	
300-8800-2	B3KF99	Total/NA	Solid	ExtChrAct	
300-8800-3	B3KF73	Total/NA	Solid	ExtChrAct	
300-8800-4	B3KF79	Total/NA	Solid	ExtChrAct	
300-8800-5	B3KF75	Total/NA	Solid	ExtChrAct	
300-8800-6	B3KFB7	Total/NA	Solid	ExtChrAct	
300-8800-7	B3KF95	Total/NA	Solid	ExtChrAct	
300-8800-8	B3KF77	Total/NA	Solid	ExtChrAct	
300-8800-9	B3KFD1	Total/NA	Solid	ExtChrAct	

Rad (Continued)

Prep Batch: 16282 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-10	B3KFD3	Total/NA	Solid	ExtChrAct	
300-8800-11	B3KF81	Total/NA	Solid	ExtChrAct	
300-8800-12	B3KF83	Total/NA	Solid	ExtChrAct	
300-8800-13	B3L185	Total/NA	Solid	ExtChrAct	
300-8800-14	B3KFC1	Total/NA	Solid	ExtChrAct	
300-8800-15	B3KFB9	Total/NA	Solid	ExtChrAct	
MB 300-16282/1-B	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16282/2-B	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8800-1 DU	B3KF93	Total/NA	Solid	ExtChrAct	

Prep Batch: 16283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-1	B3KF93	Total/NA	Solid	ExtChr_LSC	
300-8800-2	B3KF99	Total/NA	Solid	ExtChr_LSC	
300-8800-3	B3KF73	Total/NA	Solid	ExtChr_LSC	
300-8800-4	B3KF79	Total/NA	Solid	ExtChr_LSC	
300-8800-5	B3KF75	Total/NA	Solid	ExtChr_LSC	
300-8800-6	B3KFB7	Total/NA	Solid	ExtChr_LSC	
300-8800-7	B3KF95	Total/NA	Solid	ExtChr_LSC	
300-8800-8	B3KF77	Total/NA	Solid	ExtChr_LSC	
300-8800-9	B3KFD1	Total/NA	Solid	ExtChr_LSC	
300-8800-10	B3KFD3	Total/NA	Solid	ExtChr_LSC	
300-8800-11	B3KF81	Total/NA	Solid	ExtChr_LSC	
300-8800-12	B3KF83	Total/NA	Solid	ExtChr_LSC	
300-8800-13	B3L185	Total/NA	Solid	ExtChr_LSC	
300-8800-14	B3KFC1	Total/NA	Solid	ExtChr_LSC	
300-8800-15	B3KFB9	Total/NA	Solid	ExtChr_LSC	
MB 300-16283/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16283/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8800-1 DU	B3KF93	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8800-1	B3KF93	Total/NA	Solid	ExtChrAct	
300-8800-2	B3KF99	Total/NA	Solid	ExtChrAct	
300-8800-3	B3KF73	Total/NA	Solid	ExtChrAct	
300-8800-4	B3KF79	Total/NA	Solid	ExtChrAct	
300-8800-5	B3KF75	Total/NA	Solid	ExtChrAct	
300-8800-6	B3KFB7	Total/NA	Solid	ExtChrAct	
300-8800-7	B3KF95	Total/NA	Solid	ExtChrAct	
300-8800-8	B3KF77	Total/NA	Solid	ExtChrAct	
300-8800-9	B3KFD1	Total/NA	Solid	ExtChrAct	
300-8800-10	B3KFD3	Total/NA	Solid	ExtChrAct	
300-8800-11	B3KF81	Total/NA	Solid	ExtChrAct	
300-8800-12	B3KF83	Total/NA	Solid	ExtChrAct	
300-8800-13	B3L185	Total/NA	Solid	ExtChrAct	
300-8800-14	B3KFC1	Total/NA	Solid	ExtChrAct	
300-8800-15	B3KFB9	Total/NA	Solid	ExtChrAct	
MB 300-16284/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16284/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8800-1 DU	B3KF93	Total/NA	Solid	ExtChrAct	

Client Sample ID: B3KF93

Lab Sample ID: 300-8800-1
Date Collected: 11/26/18 13:03
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	357.8 g	357.8 g	16373	12/03/18 11:15	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16430	12/06/18 10:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16413	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.04 g	1.04 g	16727	12/14/18 23:18	DJ	TAL RCH

Client Sample ID: B3KF99

Lab Sample ID: 300-8800-2
Date Collected: 11/26/18 09:50
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	364.02 g	364.02 g	16373	12/03/18 11:16	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	16413	12/05/18 17:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16430	12/06/18 10:25	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.18 g	1.18 g	16727	12/15/18 03:23	DJ	TAL RCH

Client Sample ID: B3KF73

Lab Sample ID: 300-8800-3
Date Collected: 11/26/18 08:49
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	356.5 g	356.5 g	16373	12/03/18 12:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.53 g	1.53 g	16413	12/05/18 17:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	16430	12/06/18 10:25	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.53 g	1.53 g	16727	12/15/18 05:25	DJ	TAL RCH

Client Sample ID: B3KF79

Lab Sample ID: 300-8800-4

Date Collected: 11/26/18 10:34

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	373.64 g	373.64 g	16373	12/03/18 12:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.29 g	1.29 g	16413	12/05/18 17:57	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16430	12/06/18 10:25	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.29 g	1.29 g	16727	12/15/18 07:27	DJ	TAL RCH

Client Sample ID: B3KF75

Lab Sample ID: 300-8800-5

Date Collected: 11/26/18 09:28

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	359.08 g	359.08 g	16373	12/03/18 12:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16430	12/06/18 10:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16413	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	16727	12/15/18 09:30	DJ	TAL RCH

Client Sample ID: B3KFB7

Lab Sample ID: 300-8800-6

Date Collected: 11/26/18 13:26

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	373.05 g	373.05 g	16373	12/03/18 12:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	16413	12/05/18 17:57	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.22 g	1.22 g	16430	12/06/18 10:25	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.09 g	1.09 g	16727	12/15/18 11:32	DJ	TAL RCH

Client Sample ID: B3KF95

Lab Sample ID: 300-8800-7

Date Collected: 11/26/18 13:18

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	361.68 g	361.68 g	16373	12/03/18 12:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.38 g	1.38 g	16413	12/05/18 17:58	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.38 g	1.38 g	16727	12/15/18 13:34	DJ	TAL RCH

Client Sample ID: B3KF77

Lab Sample ID: 300-8800-8

Date Collected: 11/26/18 11:05

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	374.92 g	374.92 g	16373	12/04/18 09:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16413	12/05/18 17:58	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.17 g	1.17 g	16727	12/15/18 15:36	DJ	TAL RCH

Client Sample ID: B3KFD1

Lab Sample ID: 300-8800-9

Date Collected: 11/26/18 11:48

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	371.18 g	371.18 g	16373	12/04/18 09:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.41 g	1.41 g	16413	12/05/18 17:58	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.41 g	1.41 g	16727	12/15/18 19:41	DJ	TAL RCH

Client Sample ID: B3KFD3

Lab Sample ID: 300-8800-10

Date Collected: 11/26/18 12:25

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	373.42 g	373.42 g	16373	12/04/18 09:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16413	12/05/18 17:59	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.29 g	1.29 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16727	12/15/18 21:43	DJ	TAL RCH

Client Sample ID: B3KF81

Lab Sample ID: 300-8800-11

Date Collected: 11/26/18 10:22

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	344.56 g	344.56 g	16373	12/04/18 09:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16413	12/05/18 17:59	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.11 g	1.11 g	16727	12/15/18 23:46	DJ	TAL RCH

Client Sample ID: B3KF83

Lab Sample ID: 300-8800-12

Date Collected: 11/26/18 11:25

Matrix: Solid

Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	349.09 g	349.09 g	16373	12/04/18 09:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.22 g	1.22 g	16413	12/05/18 18:00	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.22 g	1.22 g	16727	12/16/18 01:48	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Client Sample ID: B3L185

Lab Sample ID: 300-8800-13
Date Collected: 11/26/18 11:48
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	334.42 g	334.42 g	16373	12/04/18 10:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16430	12/06/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16413	12/13/18 09:36	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	16727	12/16/18 03:50	DJ	TAL RCH

Client Sample ID: B3KFC1

Lab Sample ID: 300-8800-14
Date Collected: 11/26/18 12:14
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	377.52 g	377.52 g	16373	12/04/18 10:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16413	12/06/18 10:10	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16430	12/06/18 10:27	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	16727	12/16/18 05:53	DJ	TAL RCH

Client Sample ID: B3KFB9

Lab Sample ID: 300-8800-15
Date Collected: 11/26/18 12:41
Matrix: Solid
Date Received: 11/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16141	11/27/18 16:23	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16140	11/27/18 16:21	TDA	TAL RCH
Total/NA	Analysis	901.1		1	308.06 g	308.06 g	16373	12/04/18 10:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16282	12/01/18 08:08	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.59 g	1.59 g	16413	12/06/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16284	12/01/18 08:58	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16430	12/06/18 10:27	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16283	12/01/18 08:37	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.59 g	1.59 g	16727	12/16/18 07:55	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8800-1	B3KF93	Solid	11/26/18 13:03	11/27/18 09:00
300-8800-2	B3KF99	Solid	11/26/18 09:50	11/27/18 09:00
300-8800-3	B3KF73	Solid	11/26/18 08:49	11/27/18 09:00
300-8800-4	B3KF79	Solid	11/26/18 10:34	11/27/18 09:00
300-8800-5	B3KF75	Solid	11/26/18 09:28	11/27/18 09:00
300-8800-6	B3KFB7	Solid	11/26/18 13:26	11/27/18 09:00
300-8800-7	B3KF95	Solid	11/26/18 13:18	11/27/18 09:00
300-8800-8	B3KF77	Solid	11/26/18 11:05	11/27/18 09:00
300-8800-9	B3KFD1	Solid	11/26/18 11:48	11/27/18 09:00
300-8800-10	B3KFD3	Solid	11/26/18 12:25	11/27/18 09:00
300-8800-11	B3KF81	Solid	11/26/18 10:22	11/27/18 09:00
300-8800-12	B3KF83	Solid	11/26/18 11:25	11/27/18 09:00
300-8800-13	B3L185	Solid	11/26/18 11:48	11/27/18 09:00
300-8800-14	B3KFC1	Solid	11/26/18 12:14	11/27/18 09:00
300-8800-15	B3KFB9	Solid	11/26/18 12:41	11/27/18 09:00

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-025	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-13	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF93	N/A	SOIL	NOV 26 2018	1303	✓	✓

RL8800-1

300-8800 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65432 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-031	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-2	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF99	N/A	SOIL	NOV 26 2018	0950	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65435 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-005	PAGE 1 OF 1
COLLECTOR: Kevin Patterson, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL 520 J-3	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507-36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF73	N/A	SOIL	NOV 2 6 2013	0849	✓	✓

RL8800-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 6 2013 1430	SSU-1	NOV 2 6 2013 1430
SSU-1	NOV 2 7 2018 0745	Jeff Lucas /CHPRC	NOV 2 7 2018 0745
Jeff Lucas /CHPRC	NOV 2 7 2018 0900	B. Jorgenson TARL	NOV 2 7 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65422 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-011	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-6	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF79	N/A	SOIL	NOV 26 2018	1034	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65425 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-007	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-4	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N-~~ 507-36	ACTUAL SAMPLE DEPTH ~~N/A~~ 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF75	N/A	SOIL	NOV 2 6 2013	0928	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 6 2013 1430	SSU-1	NOV 2 6 2013 1430
SSU-1	NOV 2 7 2018 0745	Jeff Lucas /CHPRC	NOV 2 7 2018 0745
Jeff Lucas /CHPRC	NOV 2 7 2018 0900	B. Jorgenson TARL	NOV 2 7 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65423 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-039	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-6	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N~~ 5071 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFB7	N/A	SOIL	NOV 2 6 2018	1326	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 6 2018 1420	SSU-1	NOV 2 6 2018 1420
SSU-1	NOV 2 7 2018 0745	Jeff Lucas /CHPRC	NOV 2 7 2018 0745
Jeff Lucas /CHPRC	NOV 2 7 2018 0900	B. Jorgenson TARL	NOV 2 7 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65439 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-027	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-14	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF95	N/A	SOIL	NOV 26 2018	1318	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65433 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-009	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL 520 J-5	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: ~~HNF-N-~~ 507-36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
23KF77	N/A	SOIL	NOV 26 2018	1105	✓	✓

RL8800-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65424 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-053	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-13	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N-~~ 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFD1	N/A	SOIL	NOV 26 2018	1148	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65446 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-055	PAGE 1 OF 1
COLLECTOR: Kevin Patterson, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL 520-14	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: ~~HNF-N~~ 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFD3	N/A	SOIL	NOV 26 2018	1225	✓	✓

RL8800-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65447 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-013	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-7	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KF81	N/A	SOIL	NOV 26 2018	1022	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65426 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-015	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-8	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N-~~ 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
83KF83	N/A	SOIL	NOV 26 2018	1125	✓	✓

RL8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65427 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F18-040-060	PAGE 1 OF 1

COLLECTOR: Kevin Patterson, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC
			REQUIRED TAT: 15 Days
SAMPLING LOCATION: RTL 520 DUP1	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040
			ORIGINAL
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708
			METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L185	N/A	SOIL	NOV 26 2018	1148	✓	✓

RL8800-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65454 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-043	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-8	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFC1	N/A	SOIL	NOV 2 6 2018	1214	✓	✓

RL 8800-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 6 2018 1430	SSU-1	NOV 2 6 2018 1430
SSU-1	NOV 2 7 2018 0745	Jeff Lucas /CHPRC	NOV 2 7 2018 0745
Jeff Lucas /CHPRC	NOV 2 7 2018 0900	B. Jorgenson TARL	NOV 2 7 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65441 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-041	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-7	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFB9	N/A	SOIL	NOV 26 2018	1241	✓	✓

RL8800-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 26 2018 1430	SSU-1	NOV 26 2018 1430
SSU-1	NOV 27 2018 0745	Jeff Lucas /CHPRC	NOV 27 2018 0745
Jeff Lucas /CHPRC	NOV 27 2018 0900	B. Jorgenson TARL	NOV 27 2018 0900

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65440 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8800-1
SDG Number: RL8800-1

Login Number: 8800
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8843-1
TestAmerica Sample Delivery Group: RL8843-1
Client Project/Site: F18-040

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/21/2018 3:36:21 PM
Steven Campbell, Project Manager I
steven.campbell@testamericainc.com

Designee for

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8843-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8843-1

Comments
No additional comments.

Receipt
The samples were received on 11/29/2018 8:06 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)
The Plutonium-242 tracer yield recovery in sample B3KFC9 exceeds acceptance criteria. The results for this sample are a non-detect in Plutonium-239/240 and a result exceeding the achieved MDC but less than the CRDL in Plutonium-238. A SIR has been issued for this departure from acceptance criteria. No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: ST-RC-0245 - Plutonium-241 (LSC)
The Plutonium-242 tracer yield recovery in sample B3KFC9 exceeds acceptance criteria. The result for this sample is a non-detect. A SIR has been issued for this departure from acceptance criteria. No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION	SIR NUM: REV NUM: DATE INITIATED:

SAMPLE EVENT INFORMATION

SAF NUM(S) F18-040

OPERABLE UNIT(S)

PROJECT(S)

SAMPLING EVENT TITLE(S)

LABORATORY TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES 1

SAMPLE NUMBERS B3KFC9

SAMPLE MATRIX SOIL

COLLECTION DATE 11/28/18

SDG NUM RL8843-1

ISSUE BACKGROUND

CLASS

TYPE

DESCRIPTION

The Plutonium-242 tracer yield for the Isotopic Plutonium and Plutonium-241 analyses in the sample B3KFC9 is 117%. The Plutonium-239/240 and Plutonium-241 results for this sample are non-detects and the Plutonium-238 result exceeds its achieved MDC but is less than the CRDL. All other analytical parameters are met.

DISPOSITION

DESCRIPTION

Report results and include comment in the case narrative.

JUSTIFICATION

STEVEN CAMPBELL _____ **12/21/18**
SUBMITTED BY **DATE**

_____ _____
ACCEPTED BY **DATE**

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF97

Date Collected: 11/28/18 08:00
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.059	U		0.0971	0.370	0.0734	pCi/g	12/05/18 13:09	12/20/18 06:51	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.0832**		0.0520	0.0532	1.00	0.0465	pCi/g	12/05/18 15:32	12/18/18 14:57	1
Pu-239/240	0.00569	U	0.0151	0.0151	1.00	0.0350	pCi/g	12/05/18 15:32	12/18/18 14:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*97.8*		*30 - 105*	*12/05/18 15:32*	*12/18/18 14:57*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.306**		0.141	0.150	1.00	0.0675	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-233/234	**0.274**		0.134	0.141	1.00	0.0640	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-235/236	-0.00065	U	0.0324	0.0324	1.00	0.0595	pCi/g	12/05/18 15:35	12/12/18 16:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*68.1*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.36	U	0.0862	1.72	15.0	3.36	pCi/g	12/06/18 11:56	12/20/18 15:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*97.8*			*12/06/18 11:56*	*12/20/18 15:53*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFB5
Date Collected: 11/28/18 12:41
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00594	U		0.0780	0.370	0.0792	pCi/g	12/05/18 13:09	12/20/18 06:51	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.135**		0.0830	0.0856	1.00	0.0563	pCi/g	12/05/18 15:32	12/12/18 16:41	1
Pu-239/240	-0.0020	U	0.0251	0.0251	1.00	0.0543	pCi/g	12/05/18 15:32	12/12/18 16:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*94.2*		*30 - 105*	*12/05/18 15:32*	*12/12/18 16:41*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0469	U	0.0479	0.0484	1.00	0.0473	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-233/234	**0.191**		0.0958	0.100	1.00	0.0473	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-235/236	0.0115	U	0.0240	0.0240	1.00	0.0439	pCi/g	12/05/18 15:35	12/12/18 16:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*93.4*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:27*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.1	U	0.118	1.46	15.0	2.95	pCi/g	12/06/18 11:56	12/20/18 18:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.2*			*12/06/18 11:56*	*12/20/18 18:04*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFB3

Date Collected: 11/28/18 08:26
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-3

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0275	U		0.100	0.370	0.104	pCi/g	12/05/18 13:09	12/20/18 07:43	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0456	U	0.0471	0.0476	1.00	0.0489	pCi/g	12/05/18 15:32	12/12/18 16:41	1
Pu-239/240	0.000	U	0.0235	0.0235	1.00	0.0431	pCi/g	12/05/18 15:32	12/12/18 16:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*93.0*		*30 - 105*	*12/05/18 15:32*	*12/12/18 16:41*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.134**		0.0967	0.0991	1.00	0.0742	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-233/234	0.0670	U	0.0684	0.0692	1.00	0.0675	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-235/236	-0.0021	U	0.0343	0.0343	1.00	0.0711	pCi/g	12/05/18 15:35	12/12/18 16:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.1*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:27*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.84	U	0.0809	1.41	15.0	2.85	pCi/g	12/06/18 11:56	12/20/18 19:09	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*93.0*			*12/06/18 11:56*	*12/20/18 19:09*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF85
Date Collected: 11/28/18 11:33
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-4
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.025	U		0.0959	0.370	0.0841	pCi/g	12/05/18 13:09	12/20/18 07:43	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.133**		0.0581	0.0606	1.00	0.0344	pCi/g	12/05/18 15:32	12/18/18 14:58	1
Pu-239/240	-0.00049	U	0.0124	0.0124	1.00	0.0245	pCi/g	12/05/18 15:32	12/18/18 14:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.6*		*30 - 105*	*12/05/18 15:32*	*12/18/18 14:58*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.127**		0.0903	0.0926	1.00	0.0586	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-233/234	**0.160**		0.101	0.104	1.00	0.0586	pCi/g	12/05/18 15:35	12/12/18 16:27	1
U-235/236	0.000	U	0.0319	0.0319	1.00	0.0586	pCi/g	12/05/18 15:35	12/12/18 16:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*78.4*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:27*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.6	U	0.198	1.41	15.0	2.88	pCi/g	12/06/18 11:56	12/20/18 20:14	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*12/06/18 11:56*	*12/20/18 20:14*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFC9

Date Collected: 11/28/18 07:42
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-5

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.036	U		0.0874	0.370	0.0696	pCi/g	12/05/18 13:09	12/20/18 07:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.0896**		0.0693	0.0707	1.00	0.0667	pCi/g	12/05/18 15:32	12/13/18 09:35	1
Pu-239/240	-0.0031	U	0.0263	0.0263	1.00	0.0714	pCi/g	12/05/18 15:32	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*117*	*X*	*30 - 105*	*12/05/18 15:32*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.182**		0.116	0.120	1.00	0.0725	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-233/234	**0.0904**		0.0822	0.0836	1.00	0.0725	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-235/236	-0.00073	U	0.0368	0.0368	1.00	0.0674	pCi/g	12/05/18 15:35	12/12/18 16:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*66.9*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:28*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.9	U	0.184	1.48	15.0	3.08	pCi/g	12/06/18 11:56	12/20/18 21:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*117*			*12/06/18 11:56*	*12/20/18 21:19*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFC7

Date Collected: 11/28/18 10:53
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-6

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.036	U		0.0803	0.370	0.0620	pCi/g	12/05/18 13:09	12/20/18 07:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.150**		0.0923	0.0954	1.00	0.0643	pCi/g	12/05/18 15:32	12/13/18 09:35	1
Pu-239/240	-0.0045	U	0.0280	0.0280	1.00	0.0699	pCi/g	12/05/18 15:32	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*103*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.127**		0.0738	0.0764	1.00	0.0391	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-233/234	**0.0635**		0.0522	0.0531	1.00	0.0391	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-235/236	0.0106	U	0.0213	0.0214	1.00	0.0391	pCi/g	12/05/18 15:35	12/12/18 16:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*85.8*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:28*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.64	U	0.131	1.44	15.0	2.85	pCi/g	12/06/18 11:56	12/20/18 22:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*103*			*12/06/18 11:56*	*12/20/18 22:24*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF69
Date Collected: 11/28/18 08:52
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0127	U		0.0767	0.370	0.0844	pCi/g	12/05/18 13:09	12/20/18 07:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.102**		0.0703	0.0719	1.00	0.0599	pCi/g	12/05/18 15:32	12/13/18 09:35	1
Pu-239/240	-0.0094	U	0.0238	0.0238	1.00	0.0734	pCi/g	12/05/18 15:32	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*105*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0848**		0.0656	0.0670	1.00	0.0538	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-233/234	**0.0858**		0.0656	0.0671	1.00	0.0490	pCi/g	12/05/18 15:35	12/12/18 16:28	1
U-235/236	-0.00099	U	0.0248	0.0248	1.00	0.0490	pCi/g	12/05/18 15:35	12/12/18 16:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.1*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:28*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.7	U	0.181	1.40	15.0	2.92	pCi/g	12/06/18 11:56	12/20/18 23:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*12/06/18 11:56*	*12/20/18 23:29*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF71

Date Collected: 11/28/18 09:18
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-8

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0133	U		0.0724	0.370	0.0755	pCi/g	12/05/18 13:09	12/20/18 08:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.161**		0.0847	0.0883	1.00	0.0522	pCi/g	12/05/18 15:32	12/13/18 09:35	1
Pu-239/240	0.00699	U	0.0220	0.0220	1.00	0.0548	pCi/g	12/05/18 15:32	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*94.4*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.120**		0.0813	0.0835	1.00	0.0588	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-233/234	0.0510	U	0.0543	0.0549	1.00	0.0629	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-235/236	0.0136	U	0.0271	0.0272	1.00	0.0497	pCi/g	12/05/18 15:35	12/12/18 16:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.0*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:29*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.47	U	0.0519	1.30	15.0	2.57	pCi/g	12/06/18 11:56	12/21/18 00:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.4*			*12/06/18 11:56*	*12/21/18 00:35*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF87

Date Collected: 11/28/18 11:51
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-9

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.064	U		0.131	0.370	0.0994	pCi/g	12/05/18 13:09	12/20/18 08:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.208**		0.0957	0.101	1.00	0.0417	pCi/g	12/05/18 15:32	12/13/18 09:35	1
Pu-239/240	-0.0013	U	0.0220	0.0220	1.00	0.0473	pCi/g	12/05/18 15:32	12/13/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*103*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0801**		0.0734	0.0746	1.00	0.0683	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-233/234	0.0158	U	0.0329	0.0330	1.00	0.0603	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-235/236	0.0151	U	0.0329	0.0330	1.00	0.0648	pCi/g	12/05/18 15:35	12/12/18 16:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.2*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:29*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.5	U	0.138	1.07	15.0	2.25	pCi/g	12/06/18 11:56	12/21/18 02:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*103*			*12/06/18 11:56*	*12/21/18 02:45*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF89
Date Collected: 11/28/18 11:13
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0409	U		0.0601	0.370	0.0832	pCi/g	12/05/18 13:09	12/20/18 08:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0369	U	0.0492	0.0496	1.00	0.0734	pCi/g	12/05/18 15:32	12/13/18 09:33	1
Pu-239/240	-0.0017	U	0.0284	0.0284	1.00	0.0597	pCi/g	12/05/18 15:32	12/13/18 09:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*101*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:33*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.156**		0.105	0.108	1.00	0.0640	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-233/234	**0.0872**		0.0780	0.0793	1.00	0.0640	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-235/236	-0.00070	U	0.0349	0.0349	1.00	0.0640	pCi/g	12/05/18 15:35	12/12/18 16:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*74.8*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:29*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.5	U	0.145	1.55	15.0	3.20	pCi/g	12/06/18 11:56	12/21/18 03:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*12/06/18 11:56*	*12/21/18 03:51*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFC3

Date Collected: 11/28/18 09:53
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-11

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.026	U		0.0853	0.370	0.0650	pCi/g	12/05/18 13:09	12/20/18 08:38	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.238**		0.105	0.111	1.00	0.0533	pCi/g	12/05/18 15:32	12/13/18 09:33	1
Pu-239/240	-0.00046	U	0.0230	0.0230	1.00	0.0421	pCi/g	12/05/18 15:32	12/13/18 09:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.0*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:33*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.131**		0.0969	0.0993	1.00	0.0838	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-233/234	**0.101**		0.0839	0.0855	1.00	0.0676	pCi/g	12/05/18 15:35	12/12/18 16:29	1
U-235/236	0.000	U	0.0343	0.0343	1.00	0.0628	pCi/g	12/05/18 15:35	12/12/18 16:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*71.0*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:29*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.1	U	0.115	1.37	15.0	2.78	pCi/g	12/06/18 11:56	12/21/18 04:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.0*			*12/06/18 11:56*	*12/21/18 04:56*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3L187
Date Collected: 11/28/18 11:51
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-12
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.049	U		0.128	0.370	0.100	pCi/g	12/05/18 13:09	12/20/18 08:38	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.235**		0.100	0.106	1.00	0.0595	pCi/g	12/05/18 15:32	12/13/18 09:33	1
Pu-239/240	-0.0017	U	0.0210	0.0210	1.00	0.0468	pCi/g	12/05/18 15:32	12/13/18 09:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*103*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:33*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.174**		0.116	0.120	1.00	0.0710	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-233/234	**0.0968**		0.0866	0.0881	1.00	0.0710	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-235/236	0.0178	U	0.0388	0.0389	1.00	0.0764	pCi/g	12/05/18 15:35	12/12/18 16:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*64.1*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:30*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.4	U	0.164	1.18	15.0	2.46	pCi/g	12/06/18 11:56	12/21/18 06:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*103*			*12/06/18 11:56*	*12/21/18 06:02*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFC5

Date Collected: 11/28/18 12:24
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-13

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0334	U		0.0755	0.370	0.0878	pCi/g	12/05/18 13:09	12/20/18 09:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.0915**		0.0730	0.0744	1.00	0.0691	pCi/g	12/05/18 15:32	12/13/18 09:34	1
Pu-239/240	-0.00055	U	0.0276	0.0276	1.00	0.0506	pCi/g	12/05/18 15:32	12/13/18 09:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.1*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0756**		0.0617	0.0630	1.00	0.0463	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-233/234	**0.0867**		0.0667	0.0683	1.00	0.0524	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-235/236	0.0121	U	0.0252	0.0253	1.00	0.0463	pCi/g	12/05/18 15:35	12/12/18 16:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*67.2*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:30*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-2.4	U	0.240	1.47	15.0	3.15	pCi/g	12/06/18 11:56	12/21/18 07:07	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.1*			*12/06/18 11:56*	*12/21/18 07:07*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF91

Date Collected: 11/28/18 10:31
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-14

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.11	U		0.128	0.370	0.0770	pCi/g	12/05/18 13:09	12/20/18 09:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.158**		0.0979	0.101	1.00	0.0723	pCi/g	12/05/18 15:32	12/13/18 09:34	1
Pu-239/240	-0.0012	U	0.0295	0.0295	1.00	0.0582	pCi/g	12/05/18 15:32	12/13/18 09:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.1*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.131**		0.107	0.110	1.00	0.0802	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-233/234	**0.262**		0.151	0.158	1.00	0.0802	pCi/g	12/05/18 15:35	12/12/18 16:30	1
U-235/236	0.0428	U	0.0618	0.0623	1.00	0.0802	pCi/g	12/05/18 15:35	12/12/18 16:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*56.1*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:30*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-2.3	U	0.244	1.64	15.0	3.43	pCi/g	12/06/18 11:56	12/21/18 08:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.1*			*12/06/18 11:56*	*12/21/18 08:12*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KFB1

Date Collected: 11/28/18 10:14
Date Received: 11/29/18 08:06

Lab Sample ID: 300-8843-15

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0015	U		0.0742	0.370	0.0757	pCi/g	12/05/18 13:09	12/20/18 09:35	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	**0.0835**		0.0701	0.0712	1.00	0.0778	pCi/g	12/05/18 15:32	12/13/18 09:34	1
Pu-239/240	-0.0021	U	0.0265	0.0265	1.00	0.0586	pCi/g	12/05/18 15:32	12/13/18 09:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*102*		*30 - 105*	*12/05/18 15:32*	*12/13/18 09:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.163**		0.0988	0.102	1.00	0.0588	pCi/g	12/05/18 15:35	12/12/18 16:31	1
U-233/234	**0.0881**		0.0730	0.0743	1.00	0.0588	pCi/g	12/05/18 15:35	12/12/18 16:31	1
U-235/236	0.0119	U	0.0299	0.0300	1.00	0.0670	pCi/g	12/05/18 15:35	12/12/18 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.5*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:31*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.4	U	0.132	1.54	15.0	3.15	pCi/g	12/06/18 11:56	12/21/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*102*			*12/06/18 11:56*	*12/21/18 09:18*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8843-1	B3KF97	97.8
300-8843-1 DU	B3KF97	94.2
300-8843-2	B3KFB5	94.2
300-8843-3	B3KFB3	93.0
300-8843-4	B3KF85	99.6
300-8843-5	B3KFC9	117 X
300-8843-6	B3KFC7	103
300-8843-7	B3KF69	105
300-8843-8	B3KF71	94.4
300-8843-9	B3KF87	103
300-8843-10	B3KF89	101
300-8843-11	B3KFC3	99.0
300-8843-12	B3L187	103
300-8843-13	B3KFC5	99.1
300-8843-14	B3KF91	95.1
300-8843-15	B3KFB1	102
LCS 300-16386/2-A	Lab Control Sample	94.7
MB 300-16386/1-A	Method Blank	96.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8843-1	B3KF97	68.1
300-8843-1 DU	B3KF97	70.1
300-8843-2	B3KFB5	93.4
300-8843-3	B3KFB3	81.1
300-8843-4	B3KF85	78.4
300-8843-5	B3KFC9	66.9
300-8843-6	B3KFC7	85.8
300-8843-7	B3KF69	81.1
300-8843-8	B3KF71	84.0
300-8843-9	B3KF87	81.2
300-8843-10	B3KF89	74.8
300-8843-11	B3KFC3	71.0
300-8843-12	B3L187	64.1
300-8843-13	B3KFC5	67.2
300-8843-14	B3KF91	56.1
300-8843-15	B3KFB1	84.5
LCS 300-16387/2-A	Lab Control Sample	83.4
MB 300-16387/1-A	Method Blank	61.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8843-1	B3KF97	97.8							
300-8843-1 DU	B3KF97	94.2							
300-8843-2	B3KFB5	94.2							
300-8843-3	B3KFB3	93.0							
300-8843-4	B3KF85	105							
300-8843-5	B3KFC9	117							
300-8843-6	B3KFC7	103							
300-8843-7	B3KF69	105							
300-8843-8	B3KF71	94.4							
300-8843-9	B3KF87	103							
300-8843-10	B3KF89	101							
300-8843-11	B3KFC3	99.0							
300-8843-12	B3L187	103							
300-8843-13	B3KFC5	99.1							
300-8843-14	B3KF91	95.1							
300-8843-15	B3KFB1	102							
LCS 300-16414/2-A	Lab Control Sample	94.7							
MB 300-16414/1-A	Method Blank	96.1							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16372/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0137	U		0.0657	0.370	0.0493	pCi/g	12/05/18 13:09	12/20/18 06:50	1

Lab Sample ID: LCS 300-16372/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.518		0.191	0.370	0.0800	pCi/g	96	80 - 120		

Lab Sample ID: 300-8843-1 DU — **Client Sample ID: B3KF97**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.059	U		-0.136	U y	0.121	0.370	0.0630	pCi/g			79	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16387/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16664 — **Prep Batch: 16387**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0119	U	0.0399	0.0399	1.00	0.101	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-233/234	-0.00237	U	0.0397	0.0397	1.00	0.0823	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-235/236	0.0190	U	0.0396	0.0397	1.00	0.0726	pCi/g	12/05/18 15:35	12/12/18 16:26	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*61.7*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:26*	*1*

Lab Sample ID: LCS 300-16387/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16664 — **Prep Batch: 16387**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.37	3.670		0.735	1.00	0.0564	pCi/g	109	80 - 120		
U-233/234			3.22	3.240		0.665	1.00	0.0643	pCi/g	101	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*83.4*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8843-1 DU — **Client Sample ID: B3KF97**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16664 — **Prep Batch: 16387**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.306			0.0833	U y	0.0823	1.00	0.0928	pCi/g			114	30
U-233/234	0.274			0.154	y	0.112	1.00	0.0964	pCi/g			56	30
U-235/236	-0.00065	U		-0.00435	U y	0.0364	1.00	0.0841	pCi/g			148	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*70.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16386/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16663 — **Prep Batch: 16386**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00478	U	0.0268	0.0268	1.00	0.0666	pCi/g	12/05/18 15:32	12/12/18 16:40	1
Pu-239/240	0.000	U	0.0266	0.0266	1.00	0.0488	pCi/g	12/05/18 15:32	12/12/18 16:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.1*		*30 - 105*	*12/05/18 15:32*	*12/12/18 16:40*	*1*

Lab Sample ID: LCS 300-16386/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16663 — **Prep Batch: 16386**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.81	4.946		0.949	1.00	0.0603	pCi/g	103	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*94.7*		*30 - 105*

Lab Sample ID: 300-8843-1 DU — **Client Sample ID: B3KF97**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16663 — **Prep Batch: 16386**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0832			0.205	y	0.112	1.00	0.0759	pCi/g			85	30
Pu-239/240	0.00569	U		-0.000534	U y	0.0267	1.00	0.0490	pCi/g			241	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*94.2*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16414/1-A
Matrix: Solid
Analysis Batch: 16922

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16414

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.102	U	0.184	1.73	15.0	3.17	pCi/g	12/06/18 11:56	12/20/18 13:43	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.1*			*12/06/18 11:56*	*12/20/18 13:43*	*1*

Lab Sample ID: LCS 300-16414/2-A
Matrix: Solid
Analysis Batch: 16922

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16414

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			229	255.0		17.5	15.0	3.60	pCi/g	111	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*94.7*		

Lab Sample ID: 300-8843-1 DU
Matrix: Solid
Analysis Batch: 16903

Client Sample ID: B3KF97
Prep Type: Total/NA
Prep Batch: 16414

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.36	U		-0.602	U	1.61	15.0	3.19	pCi/g			13	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*94.2*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

General Chemistry

Analysis Batch: 16374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-1	B3KF97	Total/NA	Solid	Moisture	
300-8843-2	B3KFB5	Total/NA	Solid	Moisture	
300-8843-3	B3KFB3	Total/NA	Solid	Moisture	
300-8843-4	B3KF85	Total/NA	Solid	Moisture	
300-8843-5	B3KFC9	Total/NA	Solid	Moisture	
300-8843-6	B3KFC7	Total/NA	Solid	Moisture	
300-8843-7	B3KF69	Total/NA	Solid	Moisture	
300-8843-8	B3KF71	Total/NA	Solid	Moisture	
300-8843-9	B3KF87	Total/NA	Solid	Moisture	
300-8843-10	B3KF89	Total/NA	Solid	Moisture	
300-8843-11	B3KFC3	Total/NA	Solid	Moisture	
300-8843-12	B3L187	Total/NA	Solid	Moisture	
300-8843-13	B3KFC5	Total/NA	Solid	Moisture	
300-8843-14	B3KF91	Total/NA	Solid	Moisture	
300-8843-15	B3KFB1	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-1	B3KF97	Total/NA	Solid	Direct Addition	
300-8843-2	B3KFB5	Total/NA	Solid	Direct Addition	
300-8843-3	B3KFB3	Total/NA	Solid	Direct Addition	
300-8843-4	B3KF85	Total/NA	Solid	Direct Addition	
300-8843-5	B3KFC9	Total/NA	Solid	Direct Addition	
300-8843-6	B3KFC7	Total/NA	Solid	Direct Addition	
300-8843-7	B3KF69	Total/NA	Solid	Direct Addition	
300-8843-8	B3KF71	Total/NA	Solid	Direct Addition	
300-8843-9	B3KF87	Total/NA	Solid	Direct Addition	
300-8843-10	B3KF89	Total/NA	Solid	Direct Addition	
300-8843-11	B3KFC3	Total/NA	Solid	Direct Addition	
300-8843-12	B3L187	Total/NA	Solid	Direct Addition	
300-8843-13	B3KFC5	Total/NA	Solid	Direct Addition	
300-8843-14	B3KF91	Total/NA	Solid	Direct Addition	
300-8843-15	B3KFB1	Total/NA	Solid	Direct Addition	
MB 300-16372/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16372/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8843-1 DU	B3KF97	Total/NA	Solid	Direct Addition	

Prep Batch: 16386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-1	B3KF97	Total/NA	Solid	ExtChrAct	
300-8843-2	B3KFB5	Total/NA	Solid	ExtChrAct	
300-8843-3	B3KFB3	Total/NA	Solid	ExtChrAct	
300-8843-4	B3KF85	Total/NA	Solid	ExtChrAct	
300-8843-5	B3KFC9	Total/NA	Solid	ExtChrAct	
300-8843-6	B3KFC7	Total/NA	Solid	ExtChrAct	
300-8843-7	B3KF69	Total/NA	Solid	ExtChrAct	
300-8843-8	B3KF71	Total/NA	Solid	ExtChrAct	
300-8843-9	B3KF87	Total/NA	Solid	ExtChrAct	

Rad (Continued)

Prep Batch: 16386 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-10	B3KF89	Total/NA	Solid	ExtChrAct	
300-8843-11	B3KFC3	Total/NA	Solid	ExtChrAct	
300-8843-12	B3L187	Total/NA	Solid	ExtChrAct	
300-8843-13	B3KFC5	Total/NA	Solid	ExtChrAct	
300-8843-14	B3KF91	Total/NA	Solid	ExtChrAct	
300-8843-15	B3KFB1	Total/NA	Solid	ExtChrAct	
MB 300-16386/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16386/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8843-1 DU	B3KF97	Total/NA	Solid	ExtChrAct	

Prep Batch: 16387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-1	B3KF97	Total/NA	Solid	ExtChrAct	
300-8843-2	B3KFB5	Total/NA	Solid	ExtChrAct	
300-8843-3	B3KFB3	Total/NA	Solid	ExtChrAct	
300-8843-4	B3KF85	Total/NA	Solid	ExtChrAct	
300-8843-5	B3KFC9	Total/NA	Solid	ExtChrAct	
300-8843-6	B3KFC7	Total/NA	Solid	ExtChrAct	
300-8843-7	B3KF69	Total/NA	Solid	ExtChrAct	
300-8843-8	B3KF71	Total/NA	Solid	ExtChrAct	
300-8843-9	B3KF87	Total/NA	Solid	ExtChrAct	
300-8843-10	B3KF89	Total/NA	Solid	ExtChrAct	
300-8843-11	B3KFC3	Total/NA	Solid	ExtChrAct	
300-8843-12	B3L187	Total/NA	Solid	ExtChrAct	
300-8843-13	B3KFC5	Total/NA	Solid	ExtChrAct	
300-8843-14	B3KF91	Total/NA	Solid	ExtChrAct	
300-8843-15	B3KFB1	Total/NA	Solid	ExtChrAct	
MB 300-16387/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16387/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8843-1 DU	B3KF97	Total/NA	Solid	ExtChrAct	

Prep Batch: 16414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8843-1	B3KF97	Total/NA	Solid	ExtChr_LSC	
300-8843-2	B3KFB5	Total/NA	Solid	ExtChr_LSC	
300-8843-3	B3KFB3	Total/NA	Solid	ExtChr_LSC	
300-8843-4	B3KF85	Total/NA	Solid	ExtChr_LSC	
300-8843-5	B3KFC9	Total/NA	Solid	ExtChr_LSC	
300-8843-6	B3KFC7	Total/NA	Solid	ExtChr_LSC	
300-8843-7	B3KF69	Total/NA	Solid	ExtChr_LSC	
300-8843-8	B3KF71	Total/NA	Solid	ExtChr_LSC	
300-8843-9	B3KF87	Total/NA	Solid	ExtChr_LSC	
300-8843-10	B3KF89	Total/NA	Solid	ExtChr_LSC	
300-8843-11	B3KFC3	Total/NA	Solid	ExtChr_LSC	
300-8843-12	B3L187	Total/NA	Solid	ExtChr_LSC	
300-8843-13	B3KFC5	Total/NA	Solid	ExtChr_LSC	
300-8843-14	B3KF91	Total/NA	Solid	ExtChr_LSC	
300-8843-15	B3KFB1	Total/NA	Solid	ExtChr_LSC	
MB 300-16414/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16414/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8843-1 DU	B3KF97	Total/NA	Solid	ExtChr_LSC	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF97

Lab Sample ID: 300-8843-1
Date Collected: 11/28/18 08:00
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	373.5 g	373.5 g	16858	12/20/18 06:51	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16664	12/12/18 16:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16663	12/18/18 14:57	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	16922	12/20/18 15:53	KVM	TAL RCH

Client Sample ID: B3KFB5

Lab Sample ID: 300-8843-2
Date Collected: 11/28/18 12:41
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	363.16 g	363.16 g	16858	12/20/18 06:51	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16664	12/12/18 16:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.19 g	1.19 g	16663	12/12/18 16:41	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.19 g	1.19 g	16903	12/20/18 18:04	DJ	TAL RCH

Client Sample ID: B3KFB3

Lab Sample ID: 300-8843-3
Date Collected: 11/28/18 08:26
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	333.67 g	333.67 g	16858	12/20/18 07:43	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.97 g	0.97 g	16664	12/12/18 16:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	16663	12/12/18 16:41	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.26 g	1.26 g	16903	12/20/18 19:09	DJ	TAL RCH

Client Sample ID: B3KF85

Lab Sample ID: 300-8843-4

Date Collected: 11/28/18 11:33

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	397.24 g	397.24 g	16858	12/20/18 07:43	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16664	12/12/18 16:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	16663	12/18/18 14:58	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.15 g	1.15 g	16903	12/20/18 20:14	DJ	TAL RCH

Client Sample ID: B3KFC9

Lab Sample ID: 300-8843-5

Date Collected: 11/28/18 07:42

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	397.95 g	397.95 g	16858	12/20/18 07:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16664	12/12/18 16:28	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16663	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	16903	12/20/18 21:19	DJ	TAL RCH

Client Sample ID: B3KFC7

Lab Sample ID: 300-8843-6

Date Collected: 11/28/18 10:53

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	395.31 g	395.31 g	16858	12/20/18 07:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.39 g	1.39 g	16664	12/12/18 16:28	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	16663	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.16 g	1.16 g	16903	12/20/18 22:24	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Client Sample ID: B3KF69

Lab Sample ID: 300-8843-7

Date Collected: 11/28/18 08:52
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	363.93 g	363.93 g	16858	12/20/18 07:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.35 g	1.35 g	16664	12/12/18 16:28	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.14 g	1.14 g	16663	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.14 g	1.14 g	16903	12/20/18 23:29	DJ	TAL RCH

Client Sample ID: B3KF71

Lab Sample ID: 300-8843-8

Date Collected: 11/28/18 09:18
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	389.52 g	389.52 g	16858	12/20/18 08:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16664	12/12/18 16:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.37 g	1.37 g	16663	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.37 g	1.37 g	16903	12/21/18 00:35	DJ	TAL RCH

Client Sample ID: B3KF87

Lab Sample ID: 300-8843-9

Date Collected: 11/28/18 11:51
Matrix: Solid
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	361.01 g	361.01 g	16858	12/20/18 08:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16664	12/12/18 16:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.48 g	1.48 g	16663	12/13/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.48 g	1.48 g	16903	12/21/18 02:45	DJ	TAL RCH

Client Sample ID: B3KF89

Lab Sample ID: 300-8843-10

Date Collected: 11/28/18 11:13

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	393.94 g	393.94 g	16858	12/20/18 08:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16664	12/12/18 16:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16663	12/13/18 09:33	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.04 g	1.04 g	16903	12/21/18 03:51	DJ	TAL RCH

Client Sample ID: B3KFC3

Lab Sample ID: 300-8843-11

Date Collected: 11/28/18 09:53

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	389.07 g	389.07 g	16858	12/20/18 08:38	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16664	12/12/18 16:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.21 g	1.21 g	16663	12/13/18 09:33	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.21 g	1.21 g	16903	12/21/18 04:56	DJ	TAL RCH

Client Sample ID: B3L187

Lab Sample ID: 300-8843-12

Date Collected: 11/28/18 11:51

Matrix: Solid

Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	316.44 g	316.44 g	16858	12/20/18 08:38	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16664	12/12/18 16:30	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.37 g	1.37 g	16663	12/13/18 09:33	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.37 g	1.37 g	16903	12/21/18 06:02	DJ	TAL RCH

Client Sample ID: B3KFC5 — Lab Sample ID: 300-8843-13

Date Collected: 11/28/18 12:24 — **Matrix: Solid**
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	378.21 g	378.21 g	16858	12/20/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.53 g	1.53 g	16664	12/12/18 16:30	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16663	12/13/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	16903	12/21/18 07:07	DJ	TAL RCH

Client Sample ID: B3KF91 — Lab Sample ID: 300-8843-14

Date Collected: 11/28/18 10:31 — **Matrix: Solid**
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	397.24 g	397.24 g	16858	12/20/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16664	12/12/18 16:30	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16663	12/13/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	16903	12/21/18 08:12	DJ	TAL RCH

Client Sample ID: B3KFB1 — Lab Sample ID: 300-8843-15

Date Collected: 11/28/18 10:14 — **Matrix: Solid**
Date Received: 11/29/18 08:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16374	12/05/18 13:18	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16372	12/05/18 13:09	TDA	TAL RCH
Total/NA	Analysis	901.1		1	423.15 g	423.15 g	16858	12/20/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16387	12/05/18 15:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16664	12/12/18 16:31	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16386	12/05/18 15:32	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16663	12/13/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16414	12/06/18 11:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.05 g	1.05 g	16903	12/21/18 09:18	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8843-1	B3KF97	Solid	11/28/18 08:00	11/29/18 08:06
300-8843-2	B3KFB5	Solid	11/28/18 12:41	11/29/18 08:06
300-8843-3	B3KFB3	Solid	11/28/18 08:26	11/29/18 08:06
300-8843-4	B3KF85	Solid	11/28/18 11:33	11/29/18 08:06
300-8843-5	B3KFC9	Solid	11/28/18 07:42	11/29/18 08:06
300-8843-6	B3KFC7	Solid	11/28/18 10:53	11/29/18 08:06
300-8843-7	B3KF69	Solid	11/28/18 08:52	11/29/18 08:06
300-8843-8	B3KF71	Solid	11/28/18 09:18	11/29/18 08:06
300-8843-9	B3KF87	Solid	11/28/18 11:51	11/29/18 08:06
300-8843-10	B3KF89	Solid	11/28/18 11:13	11/29/18 08:06
300-8843-11	B3KFC3	Solid	11/28/18 09:53	11/29/18 08:06
300-8843-12	B3L187	Solid	11/28/18 11:51	11/29/18 08:06
300-8843-13	B3KFC5	Solid	11/28/18 12:24	11/29/18 08:06
300-8843-14	B3KF91	Solid	11/28/18 10:31	11/29/18 08:06
300-8843-15	B3KFB1	Solid	11/28/18 10:14	11/29/18 08:06

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-029	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520-1	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF97	N/A	SOIL	NOV 2 8 2018	0800	✓	✓

RL 8843-1

300-8843 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burghard TAKL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65434 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-037	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-5	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFB5	N/A	SOIL	NOV 28 2018	1241	✓	✓

RL 8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
Kevin Patterson CHPRC	NOV 28 2018 1400	SSU-1	NOV 28 2018 1400	TRVL-18-158 (1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};
SSU-1	NOV 29 2018 0700	Roger Friesz Jr. /CHPRC	NOV 29 2018 0700	
Roger Friesz Jr. /CHPRC	NOV 29 2018 0806	Charlette Bughard TAMU	NOV 29 2018 0806	

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65438 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-035	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-4	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFB3	N/A	SOIL	NOV 2 8 2018	0826	✓	✓

KL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burghard TAL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65437 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-017	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-9	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF85	N/A	SOIL	NOV 2 8 2018	1133	✓	✓

RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2013 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2013 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2013 0806	Charlette Burghard TARL	NOV 2 9 2013 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65428 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-051	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-12	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFC9	N/A	SOIL	NOV 2 8 2018	0742	✓	✓

8843
RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Bergner FAPL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65445 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-049	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520-11	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFC7	N/A	SOIL	NOV 2 8 2018	1053	✓	✓

RL 8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1100	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Bourgeard	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65444 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-001	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL 520 J-1	PROJECT DESIGNATION RTL 520 - Rad		SAF NO. F18-040	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N~~ 507-36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF69	N/A	SOIL	NOV 2 8 2018	0852	✓	✓

RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burghard	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65420 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-003	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520 J-2	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF71	N/A	SOIL	NOV 2 8 2018	0918	✓	✓

RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burgher TAR	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/26/2018 FSR ID = FSR65421 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-019	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520 J-10	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

RL8843-1

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF87	N/A	SOIL	NOV 2 8 2018	1151	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burghard TARL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65429 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-021	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520 J-11	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507-36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF89	N/A	SOIL	NOV 2 8 2018	1113	✓	✓

RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Bugbee TABL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65430 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-045	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL 520-9	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFC3	N/A	SOIL	NOV 2 8 2018	0953	✓	✓

RL8843-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Burghart TRL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65442 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-062	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL 520 DUP2	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

RL8843-1

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L187	N/A	SOIL	NOV 2 8 2018	1151	✓	✓

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlette Bugland CHPRC	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65455 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-047	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520-10	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFC5	N/A	SOIL	NOV 2 8 2018	1224	✓	✓

RL 8843-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	TARL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

C. Burghard

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65443 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-023	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520 J-12	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KF91	N/A	SOIL	NOV 2 8 2018	1031	✓	✓

RL8843-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	[illegible] ARL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

C. Burghard

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65431 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-040-033	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL 520-3	PROJECT DESIGNATION: RTL 520 - Rad		SAF NO.: F18-040	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	60mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON {Cobalt-60};

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KFB1	N/A	SOIL	NOV 2 8 2018	1014	✓	✓

RL8843-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 8 2018 1400	SSU-1	NOV 2 8 2018 1400
SSU-1	NOV 2 9 2018 0700	Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0700
Roger Friesz Jr. /CHPRC	NOV 2 9 2018 0806	Charlotte Byrd TARL	NOV 2 9 2018 0806

SPECIAL INSTRUCTIONS
TRVL-18-158
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

C. Burghard

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65436 TRVL NUM = TRVL-18-158 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8843-1
SDG Number: RL8843-1

Login Number: 8843
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8699-1
TestAmerica Sample Delivery Group: RL8699-1
Client Project/Site: F18-042

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/19/2018 12:17:38 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8699-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8699-1

Comments
No additional comments.

Receipt
The samples were received on 11/13/2018 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method(s) A-01-R: The laboratory control sample (LCS) associated with preparation batch 300-15830 and analytical batch 300-16039 was elevated at 141%. For more information see the attached SIR.

Method(s) A-01-R: The LCS U-238 recovery is slightly low at 74%. The spectra is somewhat smeared which could affect the recovery. The sample spectra do not show smearing. For more information see the attached SIR.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0232
Rev. Number: 2
Date Initiated: 12/12/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-042

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 5

SAMPLE NUMBERS: B3KL20, B3KL21, B3KL32, B3KL33, B3KL37

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8699-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for U-238 is 74%. Results are lower than the CRDL.

The LCS recovery for PUISO is 141%. Sample results are a non detect.

New Information received on 12/12/18

The original recoveries for the LCS were:

U-234: tracer yield- 30% LCS recovery: 101%
U-238: tracer yield-30% LCS recovery: 74%

The reanalysis LCS recoveries:
U-234: tracer yield- 28% LCS recovery: 123%
U-238: tracer yield-28% LCS recovery: 105%

RESOLUTION

PROPOSED RESOLUTION: Original Proposed Resolutions:
(1) Re-prep and re-run the LCS for U-238.
(2) Flag the LCS result for PUISO and report the result.

FINAL RESOLUTION: Final Resolution based on information received on 12/12/18 (above):

Report the initial analysis results for the U234, U238 LCS recoveries and issue analytical report.

SUBMITTED BY:

WORTHY, A 12/12/2018

ACCEPTED BY:

HEY, BE 12/12/2018

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0251
Rev. Number: 0
Date Initiated: 12/04/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-042

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 5

SAMPLE NUMBERS: B3KL20, B3KL21, B3KL32, B3KL33, B3KL37

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8699-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for PUISO is 121%. The sample results are a non-detect.

RESOLUTION

PROPOSED RESOLUTION: Flag the LCS results with "o", narrate, and report results.

FINAL RESOLUTION: Please see the Proposed Resolution.

SUBMITTED BY:

WORTHY, A 12/04/2018

ACCEPTED BY:

HEY, BE 12/04/2018

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL21
Date Collected: 11/12/18 11:32
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.056	U		0.107		0.0782	pCi/g	11/14/18 09:45	11/15/18 15:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0046	U	0.0290	0.0290	1.00	0.0705	pCi/g	11/14/18 10:19	11/21/18 15:59	1
Pu-239/240	-0.012	U o	0.0292	0.0293	1.00	0.0864	pCi/g	11/14/18 10:19	11/21/18 15:59	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.9*		*20 - 115*	*11/14/18 10:19*	*11/21/18 15:59*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.142**	**o**	0.107	0.110	1.00	0.103	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-233/234	**0.251**		0.142	0.148	1.00	0.112	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-235/236	-0.0061	U	0.0381	0.0382	1.00	0.0928	pCi/g	11/14/18 11:12	11/19/18 09:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*66.2*		*20 - 115*	*11/14/18 11:12*	*11/19/18 09:01*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.549	U	0.0702	1.61	15.0	2.52	pCi/g	11/15/18 14:21	11/26/18 21:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.9*			*11/15/18 14:21*	*11/26/18 21:19*	*1*

Client Sample ID: B3KL32
Date Collected: 11/12/18 12:11
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0659	U		0.0802		0.106	pCi/g	11/14/18 09:45	11/15/18 15:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0028	U	0.0286	0.0286	1.00	0.0641	pCi/g	11/14/18 10:19	11/21/18 16:00	1
Pu-239/240	-0.0040	U o	0.0286	0.0286	1.00	0.0680	pCi/g	11/14/18 10:19	11/21/18 16:00	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL32
Date Collected: 11/12/18 12:11
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-2
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	97.3		20 - 115	11/14/18 10:19	11/21/18 16:00	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0715	U o	0.0927	0.0936	1.00	0.131	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-233/234	**0.236**		0.160	0.166	1.00	0.116	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-235/236	-0.0011	U	0.0534	0.0534	1.00	0.0980	pCi/g	11/14/18 11:12	11/19/18 09:01	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	44.9		20 - 115	11/14/18 11:12	11/19/18 09:01	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.66	U	0.119	1.52	15.0	2.46	pCi/g	11/15/18 14:21	11/26/18 23:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	97.3			11/15/18 14:21	11/26/18 23:24	1

Client Sample ID: B3KL37
Date Collected: 11/12/18 12:11
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-3
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0081	U		0.116		0.0947	pCi/g	11/14/18 09:45	11/16/18 08:45	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0108	U	0.0285	0.0286	1.00	0.0659	pCi/g	11/14/18 10:19	11/21/18 16:02	1
Pu-239/240	-0.00057	U o	0.0284	0.0284	1.00	0.0521	pCi/g	11/14/18 10:19	11/21/18 16:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	95.0		20 - 115	11/14/18 10:19	11/21/18 16:02	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.0065	U o	0.0558	0.0558	1.00	0.183	pCi/g	11/14/18 11:12	11/19/18 09:02	1
U-233/234	0.0501	U	0.0771	0.0777	1.00	0.118	pCi/g	11/14/18 11:12	11/19/18 09:02	1
U-235/236	-0.0011	U	0.0545	0.0545	1.00	0.0999	pCi/g	11/14/18 11:12	11/19/18 09:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	43.6		20 - 115	11/14/18 11:12	11/19/18 09:02	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL37
Date Collected: 11/12/18 12:11
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-3
Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.0328	U	0.153	1.60	15.0	2.51	pCi/g	11/15/18 14:21	11/27/18 03:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.0*			*11/15/18 14:21*	*11/27/18 03:35*	*1*

Client Sample ID: B3KL20
Date Collected: 11/12/18 11:05
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-4
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0456	U		0.0673		0.0892	pCi/g	11/14/18 09:45	11/16/18 08:46	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00729	U	0.0307	0.0307	1.00	0.0823	pCi/g	11/14/18 10:19	11/21/18 16:03	1
Pu-239/240	-0.0024	U o	0.0305	0.0305	1.00	0.0659	pCi/g	11/14/18 10:19	11/21/18 16:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.9*		*20 - 115*	*11/14/18 10:19*	*11/21/18 16:03*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.168**	**o**	0.102	0.105	1.00	0.0562	pCi/g	11/14/18 11:12	11/19/18 13:45	1
U-233/234	**0.0912**		0.0750	0.0764	1.00	0.0562	pCi/g	11/14/18 11:12	11/19/18 13:45	1
U-235/236	0.000	U	0.0306	0.0306	1.00	0.0562	pCi/g	11/14/18 11:12	11/19/18 13:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.2*		*20 - 115*	*11/14/18 11:12*	*11/19/18 13:45*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.79	U	0.0810	1.53	15.0	2.51	pCi/g	11/15/18 14:21	11/27/18 05:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.9*			*11/15/18 14:21*	*11/27/18 05:40*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL33

Date Collected: 11/12/18 13:45
Date Received: 11/13/18 10:00

Lab Sample ID: 300-8699-5

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.017	U		0.0750		0.0687	pCi/g	11/14/18 09:45	11/16/18 08:46	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0049	U	0.0305	0.0305	1.00	0.0743	pCi/g	11/14/18 10:19	11/21/18 16:04	1
Pu-239/240	-0.00061	U o	0.0304	0.0304	1.00	0.0557	pCi/g	11/14/18 10:19	11/21/18 16:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.4*		*20 - 115*	*11/14/18 10:19*	*11/21/18 16:04*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0996**	**o**	0.0753	0.0769	1.00	0.0523	pCi/g	11/14/18 11:12	11/19/18 09:03	1
U-233/234	0.0416	U	0.0493	0.0498	1.00	0.0562	pCi/g	11/14/18 11:12	11/19/18 09:03	1
U-235/236	-0.0011	U	0.0285	0.0285	1.00	0.0562	pCi/g	11/14/18 11:12	11/19/18 09:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*87.6*		*20 - 115*	*11/14/18 11:12*	*11/19/18 09:03*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.5	U	0.135	1.51	15.0	2.53	pCi/g	11/15/18 14:21	11/27/18 07:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.4*			*11/15/18 14:21*	*11/27/18 07:45*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**Pu-242(T) (20-115)**						
300-8699-1	B3KL21	95.9						
300-8699-2	B3KL32	97.3						
300-8699-2 DU	B3KL32	111						
300-8699-3	B3KL37	95.0						
300-8699-4	B3KL20	91.9						
300-8699-5	B3KL33	95.4						
LCS 300-15830/2-A	Lab Control Sample	99.4						
MB 300-15830/1-A	Method Blank	115						

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**U-232(T) (20-115)**						
300-8699-1	B3KL21	66.2						
300-8699-2	B3KL32	44.9						
300-8699-3	B3KL37	43.6						
300-8699-3 DU	B3KL37	49.3						
300-8699-4	B3KL20	83.2						
300-8699-5	B3KL33	87.6						
LCS 300-15835/2-A	Lab Control Sample	29.8						
MB 300-15835/1-A	Method Blank	34.4						

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**						
300-8699-1	B3KL21	95.9						
300-8699-2	B3KL32	97.3						
300-8699-2 DU	B3KL32	111						
300-8699-3	B3KL37	95.0						
300-8699-4	B3KL20	91.9						
300-8699-5	B3KL33	95.4						
LCS 300-15889/2-A	Lab Control Sample	99.4						
MB 300-15889/1-A	Method Blank	115						

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15825/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0211	U		0.0837		0.0493	pCi/g	11/14/18 09:45	11/15/18 15:21	1

Lab Sample ID: LCS 300-15825/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.65	2.430		0.189		0.0944	pCi/g	92	75 - 125		

Lab Sample ID: 300-8699-1 DU — **Client Sample ID: B3KL21**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.056	U		-0.0104	U	0.0903		0.0860	pCi/g			138	35

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15835/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16024 — **Prep Batch: 15835**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.0152	U	0.0695	0.0696	1.00	0.180	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-233/234	-0.00552	U	0.0691	0.0691	1.00	0.150	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-235/236	-0.00276	U	0.0690	0.0690	1.00	0.136	pCi/g	11/14/18 11:12	11/19/18 09:01	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*34.4*		*20 - 115*	*11/14/18 11:12*	*11/19/18 09:01*	*1*

Lab Sample ID: LCS 300-15835/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16024 — **Prep Batch: 15835**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			1.80	1.330	o	0.550	1.00	0.199	pCi/g	74	75 - 125		
U-233/234			1.72	1.739		0.654	1.00	0.194	pCi/g	101	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*29.8*		*20 - 115*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8699-3 DU
Matrix: Solid
Analysis Batch: 16024

Client Sample ID: B3KL37
Prep Type: Total/NA
Prep Batch: 15835

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	-0.0065	U o		0.0953	o y	0.0969	1.00	0.0874	pCi/g			230	35
U-233/234	0.0501	U		0.114	y	0.109	1.00	0.107	pCi/g			78	35
U-235/236	-0.0011	U		-0.000953	U	0.0477	1.00	0.0874	pCi/g			13	

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*49.3*		*20 - 115*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15830/1-A
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15830

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00114	U	0.0286	0.0286	1.00	0.0649	pCi/g	11/14/18 10:19	11/21/18 15:59	1
Pu-239/240	-0.00457	U	0.0287	0.0287	1.00	0.0805	pCi/g	11/14/18 10:19	11/21/18 15:59	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*115*		*20 - 115*	*11/14/18 10:19*	*11/21/18 15:59*	*1*

Lab Sample ID: LCS 300-15830/2-A
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15830

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.908	1.280	o	0.358	1.00	0.0724	pCi/g	141	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*99.4*		*20 - 115*

Lab Sample ID: 300-8699-2 DU
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: B3KL32
Prep Type: Total/NA
Prep Batch: 15830

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0028	U		-0.00525	U y	0.0265	1.00	0.0749	pCi/g			59	35
Pu-239/240	-0.0040	U o		-0.000525	U o y	0.0263	1.00	0.0536	pCi/g			153	35

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*111*		*20 - 115*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15889/1-A
Matrix: Solid
Analysis Batch: 16165

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15889

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.980	U	0.105	1.48	15.0	2.41	pCi/g	11/15/18 14:21	11/26/18 17:08	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*115*			*11/15/18 14:21*	*11/26/18 17:08*	*1*

Lab Sample ID: LCS 300-15889/2-A
Matrix: Solid
Analysis Batch: 16165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15889

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			224	242.1		16.1	15.0	2.45	pCi/g	108	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*99.4*		

Lab Sample ID: 300-8699-2 DU
Matrix: Solid
Analysis Batch: 16165

Client Sample ID: B3KL32
Prep Type: Total/NA
Prep Batch: 15889

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.66	U		0.00649	U y	1.51	15.0	2.41	pCi/g			204	35

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*111*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

General Chemistry

Analysis Batch: 15853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-1	B3KL21	Total/NA	Solid	Moisture	
300-8699-2	B3KL32	Total/NA	Solid	Moisture	
300-8699-3	B3KL37	Total/NA	Solid	Moisture	
300-8699-4	B3KL20	Total/NA	Solid	Moisture	
300-8699-5	B3KL33	Total/NA	Solid	Moisture	

Rad

Prep Batch: 15825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-1	B3KL21	Total/NA	Solid	Direct Addition	
300-8699-2	B3KL32	Total/NA	Solid	Direct Addition	
300-8699-3	B3KL37	Total/NA	Solid	Direct Addition	
300-8699-4	B3KL20	Total/NA	Solid	Direct Addition	
300-8699-5	B3KL33	Total/NA	Solid	Direct Addition	
MB 300-15825/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-15825/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8699-1 DU	B3KL21	Total/NA	Solid	Direct Addition	

Prep Batch: 15830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-1	B3KL21	Total/NA	Solid	ExtChrAct	
300-8699-2	B3KL32	Total/NA	Solid	ExtChrAct	
300-8699-3	B3KL37	Total/NA	Solid	ExtChrAct	
300-8699-4	B3KL20	Total/NA	Solid	ExtChrAct	
300-8699-5	B3KL33	Total/NA	Solid	ExtChrAct	
MB 300-15830/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-15830/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8699-2 DU	B3KL32	Total/NA	Solid	ExtChrAct	

Prep Batch: 15835

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-1	B3KL21	Total/NA	Solid	ExtChrAct	
300-8699-2	B3KL32	Total/NA	Solid	ExtChrAct	
300-8699-3	B3KL37	Total/NA	Solid	ExtChrAct	
300-8699-4	B3KL20	Total/NA	Solid	ExtChrAct	
300-8699-5	B3KL33	Total/NA	Solid	ExtChrAct	
MB 300-15835/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-15835/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8699-3 DU	B3KL37	Total/NA	Solid	ExtChrAct	

Prep Batch: 15889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-1	B3KL21	Total/NA	Solid	ExtChr_LSC	
300-8699-2	B3KL32	Total/NA	Solid	ExtChr_LSC	
300-8699-3	B3KL37	Total/NA	Solid	ExtChr_LSC	
300-8699-4	B3KL20	Total/NA	Solid	ExtChr_LSC	
300-8699-5	B3KL33	Total/NA	Solid	ExtChr_LSC	
MB 300-15889/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-15889/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Rad (Continued)

Prep Batch: 15889 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8699-2 DU	B3KL32	Total/NA	Solid	ExtChr_LSC	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL21

Lab Sample ID: 300-8699-1
Date Collected: 11/12/18 11:32
Matrix: Solid
Date Received: 11/13/18 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15853	11/14/18 16:08	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15825	11/14/18 09:45	TDA	TAL RCH
Total/NA	Analysis	901.1		1	346.03 g	346.03 g	15920	11/15/18 15:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15835	11/14/18 11:12	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16024	11/19/18 09:01	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15830	11/14/18 10:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16039	11/21/18 15:59	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15889	11/15/18 14:21	DJJ	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	16165	11/26/18 21:19	DJ	TAL RCH

Client Sample ID: B3KL32

Lab Sample ID: 300-8699-2
Date Collected: 11/12/18 12:11
Matrix: Solid
Date Received: 11/13/18 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15853	11/14/18 16:08	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15825	11/14/18 09:45	TDA	TAL RCH
Total/NA	Analysis	901.1		1	366.54 g	366.54 g	15920	11/15/18 15:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15835	11/14/18 11:12	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16024	11/19/18 09:01	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15830	11/14/18 10:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16039	11/21/18 16:00	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15889	11/15/18 14:21	DJJ	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	16165	11/26/18 23:24	DJ	TAL RCH

Client Sample ID: B3KL37

Lab Sample ID: 300-8699-3
Date Collected: 11/12/18 12:11
Matrix: Solid
Date Received: 11/13/18 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15853	11/14/18 16:08	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15825	11/14/18 09:45	TDA	TAL RCH
Total/NA	Analysis	901.1		1	382.4 g	382.4 g	15920	11/16/18 08:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15835	11/14/18 11:12	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	16024	11/19/18 09:02	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15830	11/14/18 10:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16039	11/21/18 16:02	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15889	11/15/18 14:21	DJJ	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	16165	11/27/18 03:35	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Client Sample ID: B3KL20

Lab Sample ID: 300-8699-4

Date Collected: 11/12/18 11:05
Matrix: Solid
Date Received: 11/13/18 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15853	11/14/18 16:08	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15825	11/14/18 09:45	TDA	TAL RCH
Total/NA	Analysis	901.1		1	362.99 g	362.99 g	15920	11/16/18 08:46	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15835	11/14/18 11:12	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16024	11/19/18 13:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15830	11/14/18 10:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16039	11/21/18 16:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15889	11/15/18 14:21	DJJ	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16165	11/27/18 05:40	DJ	TAL RCH

Client Sample ID: B3KL33

Lab Sample ID: 300-8699-5

Date Collected: 11/12/18 13:45
Matrix: Solid
Date Received: 11/13/18 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15853	11/14/18 16:08	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15825	11/14/18 09:45	TDA	TAL RCH
Total/NA	Analysis	901.1		1	352 g	352 g	15920	11/16/18 08:46	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15835	11/14/18 11:12	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16024	11/19/18 09:03	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15830	11/14/18 10:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16039	11/21/18 16:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15889	11/15/18 14:21	DJJ	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	16165	11/27/18 07:45	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8699-1	B3KL21	Solid	11/12/18 11:32	11/13/18 10:00
300-8699-2	B3KL32	Solid	11/12/18 12:11	11/13/18 10:00
300-8699-3	B3KL37	Solid	11/12/18 12:11	11/13/18 10:00
300-8699-4	B3KL20	Solid	11/12/18 11:05	11/13/18 10:00
300-8699-5	B3KL33	Solid	11/12/18 13:45	11/13/18 10:00

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-002	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Vault and 530 J-16	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL21	N/A	SOIL	NOV 12 2018	1132	✓	✓

300-8699 COC

8699
RL8699-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 12 2018 (50)	SSU-1	NOV 12 2018 (50)
SSU-1	NOV 13 2018 0815	Lesly Wall /CHPRC	NOV 13 2018 0815
Lesly Wall /CHPRC	NOV 13 2018 1000	T. Holm TARL	NOV 13 2018 1000

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64735 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-013	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Vault-10	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL32	N/A	SOIL	NOV 1 2 2018	1211	✓	✓

8699
RL 8699-1

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 1 2 2018 1500	SSU-1	NOV 1 2 2018 1500
SSU-1	NOV 1 3 2018 0815	Lesly Wall /CHPRC	NOV 1 3 2018 0815
Lesly Wall /CHPRC	NOV 1 3 2018 1000	T. Hoim TARL	NOV 1 3 2018 1000

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64746 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-018	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Vault-DUP1	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL37	N/A	SOIL	NOV 1 2 2018	1211	✓	✓

8699
RL8699-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 1 2 2018 1500	SSU-1	NOV 1 2 2018 1500
SSU-1	NOV 1 3 2018 0815	Lesty Wall /CHPRC	NOV 1 3 2018 0815
Lesty Wall /CHPRC	NOV 1 3 2018 1000	T. Holm TARL	NOV 1 3 2018 1000

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64751 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-001	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault and 530 J-15	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL20	N/A	SOIL	NOV 12 2018	1105	✓	✓

8699
RL8699-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 12 2018 1500	SSU-1	NOV 12 2018 1500
SSU-1	NOV 13 2018 0815	Lesly Wall /CHPRC	NOV 13 2018 0815
Lesly Wall /CHPRC	NOV 13 2018 1000	T. Holm TARL	NOV 13 2018 1000

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64734 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-014	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-11	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL33	N/A	SOIL	NOV 1 2 2018	1345	✓	✓

8699
RL8699-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 1 2 2018 1500	SSU-1	NOV 1 2 2018 1500
SSU-1	NOV 1 3 2018 0815	Lesly Wall /CHPRC	NOV 1 3 2018 0815
Lesly Wall /CHPRC	NOV 1 3 2018 1000	T. Hoim TARL	NOV 1 3 2018 1000

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64747 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8699-1
SDG Number: RL8699-1

Login Number: 8699
List Number: 1
Creator: Holm, Tina R

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8711-1
TestAmerica Sample Delivery Group: RL8711-1
Client Project/Site: F18-042

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/5/2018 4:03:02 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8711-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8711-1

Comments
No additional comments.

Receipt
The samples were received on 11/14/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method(s) A-01-R: The LCS tracer recovery is below the QC limit of 30% : The radiochem recovery is acceptable.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL29

Lab Sample ID: 300-8711-1

Date Collected: 11/13/18 12:56
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.029	U		0.119	0.370	0.0905	pCi/g	11/15/18 10:56	11/16/18 10:30	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0226	U	0.0382	0.0384	1.00	0.0660	pCi/g	11/15/18 13:07	11/21/18 16:05	1
Pu-239/240	-0.00054	U	0.0270	0.0270	1.00	0.0495	pCi/g	11/15/18 13:07	11/21/18 16:05	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*85.4*		*30 - 105*	*11/15/18 13:07*	*11/21/18 16:05*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.147	U	0.144	0.146	1.00	0.200	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-233/234	0.107	U	0.113	0.115	1.00	0.150	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-235/236	0.0182	U	0.0508	0.0509	1.00	0.121	pCi/g	11/15/18 14:05	11/20/18 15:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*49.2*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:32*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.43	U	0.122	1.33	15.0	2.05	pCi/g	11/15/18 14:03	11/28/18 22:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.4*			*11/15/18 14:03*	*11/28/18 22:37*	*1*

Client Sample ID: B3KL38

Lab Sample ID: 300-8711-2

Date Collected: 11/13/18 08:51
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.012	U		0.0946	0.370	0.0876	pCi/g	11/15/18 10:56	11/16/18 10:31	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0287	U	0.0472	0.0474	1.00	0.0832	pCi/g	11/15/18 13:07	11/21/18 16:06	1
Pu-239/240	-0.0016	U	0.0271	0.0271	1.00	0.0563	pCi/g	11/15/18 13:07	11/21/18 16:06	1

Client Sample ID: B3KL38

Lab Sample ID: 300-8711-2

Date Collected: 11/13/18 08:51
Matrix: Solid
Date Received: 11/14/18 09:25

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	95.7		30 - 105	11/15/18 13:07	11/21/18 16:06	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.143		0.105	0.109	1.00	0.0913	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-233/234	0.204		0.124	0.129	1.00	0.0684	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-235/236	0.0179	U	0.0373	0.0374	1.00	0.0684	pCi/g	11/15/18 14:05	11/20/18 15:32	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	51.1		30 - 105	11/15/18 14:05	11/20/18 15:32	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	3.62		0.199	1.43	15.0	2.02	pCi/g	11/15/18 14:03	11/29/18 00:39	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	95.7			11/15/18 14:03	11/29/18 00:39	1

Client Sample ID: B3KL27

Lab Sample ID: 300-8711-3

Date Collected: 11/13/18 11:06
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.12	U		0.132	0.370	0.0856	pCi/g	11/15/18 10:56	11/16/18 10:32	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0192	U	0.0441	0.0443	1.00	0.0918	pCi/g	11/15/18 13:07	11/21/18 16:07	1
Pu-239/240	-0.0093	U	0.0313	0.0314	1.00	0.0867	pCi/g	11/15/18 13:07	11/21/18 16:07	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	96.3		30 - 105	11/15/18 13:07	11/21/18 16:07	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.182		0.101	0.106	1.00	0.0555	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-233/234	0.0967		0.0744	0.0760	1.00	0.0585	pCi/g	11/15/18 14:05	11/20/18 15:32	1
U-235/236	-0.0028	U	0.0282	0.0282	1.00	0.0632	pCi/g	11/15/18 14:05	11/20/18 15:32	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	69.8		30 - 105	11/15/18 14:05	11/20/18 15:32	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL27

Lab Sample ID: 300-8711-3
Date Collected: 11/13/18 11:06
Matrix: Solid
Date Received: 11/14/18 09:25

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.467	U	0.0508	1.36	15.0	2.20	pCi/g	11/15/18 14:03	11/29/18 04:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.3*			*11/15/18 14:03*	*11/29/18 04:44*	*1*

Client Sample ID: B3KL28

Lab Sample ID: 300-8711-4
Date Collected: 11/13/18 12:30
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0154	U		0.0817	0.370	0.0875	pCi/g	11/15/18 10:56	11/16/18 10:31	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0093	U	0.0278	0.0278	1.00	0.0789	pCi/g	11/15/18 13:07	11/21/18 16:08	1
Pu-239/240	-0.0022	U	0.0275	0.0275	1.00	0.0594	pCi/g	11/15/18 13:07	11/21/18 16:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*85.6*		*30 - 105*	*11/15/18 13:07*	*11/21/18 16:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0758	U	0.0848	0.0857	1.00	0.128	pCi/g	11/15/18 14:05	11/20/18 15:33	1
U-233/234	**0.121**		0.0901	0.0924	1.00	0.0815	pCi/g	11/15/18 14:05	11/20/18 15:33	1
U-235/236	-0.0019	U	0.0319	0.0319	1.00	0.0663	pCi/g	11/15/18 14:05	11/20/18 15:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*73.6*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:33*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.93	U	0.0771	1.27	15.0	2.15	pCi/g	11/15/18 14:03	11/29/18 08:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.6*			*11/15/18 14:03*	*11/29/18 08:49*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL26

Lab Sample ID: 300-8711-5

Date Collected: 11/13/18 10:40
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.024	U		0.116	0.370	0.0998	pCi/g	11/15/18 10:56	11/16/18 12:12	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0198	U	0.0391	0.0393	1.00	0.0758	pCi/g	11/15/18 13:07	11/21/18 16:08	1
Pu-239/240	-0.0017	U	0.0276	0.0276	1.00	0.0573	pCi/g	11/15/18 13:07	11/21/18 16:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*93.2*		*30 - 105*	*11/15/18 13:07*	*11/21/18 16:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0721	U	0.0751	0.0761	1.00	0.0815	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-233/234	**0.149**		0.106	0.109	1.00	0.0741	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-235/236	-0.00075	U	0.0376	0.0376	1.00	0.0689	pCi/g	11/15/18 14:05	11/20/18 15:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*61.8*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:34*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.12	U	0.0659	1.26	15.0	2.05	pCi/g	11/15/18 14:03	11/29/18 10:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*93.2*			*11/15/18 14:03*	*11/29/18 10:52*	*1*

Client Sample ID: B3KL22

Lab Sample ID: 300-8711-6

Date Collected: 11/13/18 08:51
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.034	U		0.101	0.370	0.0860	pCi/g	11/15/18 10:56	11/16/18 12:13	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00575	U	0.0264	0.0265	1.00	0.0731	pCi/g	11/15/18 13:07	11/21/18 16:08	1
Pu-239/240	-0.00052	U	0.0262	0.0262	1.00	0.0487	pCi/g	11/15/18 13:07	11/21/18 16:08	1

Client Sample ID: B3KL22

Lab Sample ID: 300-8711-6

Date Collected: 11/13/18 08:51

Matrix: Solid

Date Received: 11/14/18 09:25

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	102		30 - 105	11/15/18 13:07	11/21/18 16:08	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.146		0.0972	0.100	1.00	0.0595	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-233/234	0.130		0.0917	0.0941	1.00	0.0595	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-235/236	0.0156	U	0.0324	0.0325	1.00	0.0595	pCi/g	11/15/18 14:05	11/20/18 15:34	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	72.3		30 - 105	11/15/18 14:05	11/20/18 15:34	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.35	U	0.0491	1.27	15.0	2.12	pCi/g	11/15/18 14:03	11/29/18 12:54	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	102			11/15/18 14:03	11/29/18 12:54	1

Client Sample ID: B3KL25

Lab Sample ID: 300-8711-7

Date Collected: 11/13/18 09:53

Matrix: Solid

Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0288	U		0.0885	0.370	0.0932	pCi/g	11/15/18 10:56	11/16/18 12:13	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0013	U	0.0323	0.0323	1.00	0.0643	pCi/g	11/15/18 13:07	11/26/18 11:39	1
Pu-239/240	-0.0052	U	0.0325	0.0325	1.00	0.0797	pCi/g	11/15/18 13:07	11/26/18 11:39	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	101		30 - 105	11/15/18 13:07	11/26/18 11:39	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0805		0.0720	0.0731	1.00	0.0591	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-233/234	0.0637		0.0644	0.0652	1.00	0.0591	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-235/236	0.000	U	0.0322	0.0322	1.00	0.0591	pCi/g	11/15/18 14:05	11/20/18 15:34	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	81.7		30 - 105	11/15/18 14:05	11/20/18 15:34	1

Client Sample ID: B3KL25

Lab Sample ID: 300-8711-7
Date Collected: 11/13/18 09:53
Matrix: Solid
Date Received: 11/14/18 09:25

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.48	U	0.0524	1.28	15.0	2.12	pCi/g	11/15/18 14:03	11/29/18 14:57	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*11/15/18 14:03*	*11/29/18 14:57*	*1*

Client Sample ID: B3KL24

Lab Sample ID: 300-8711-8
Date Collected: 11/13/18 09:29
Matrix: Solid
Date Received: 11/14/18 09:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.063	U		0.110	0.370	0.0853	pCi/g	11/15/18 10:56	11/16/18 12:14	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.000	U	0.0329	0.0329	1.00	0.0609	pCi/g	11/15/18 13:07	11/26/18 11:39	1
Pu-239/240	-0.0020	U	0.0329	0.0329	1.00	0.0690	pCi/g	11/15/18 13:07	11/26/18 11:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*101*		*30 - 105*	*11/15/18 13:07*	*11/26/18 11:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0332	U	0.0500	0.0503	1.00	0.0735	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-233/234	**0.176**		0.112	0.116	1.00	0.0648	pCi/g	11/15/18 14:05	11/20/18 15:34	1
U-235/236	-0.00071	U	0.0353	0.0353	1.00	0.0648	pCi/g	11/15/18 14:05	11/20/18 15:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*64.9*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:34*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.44	U	0.0517	1.29	15.0	2.15	pCi/g	11/15/18 14:03	11/29/18 16:59	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*11/15/18 14:03*	*11/29/18 16:59*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL23

Date Collected: 11/13/18 10:18
Date Received: 11/14/18 09:25

Lab Sample ID: 300-8711-9

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.062	U		0.114	0.370	0.0872	pCi/g	11/15/18 10:56	11/16/18 12:14	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0045	U	0.0254	0.0255	1.00	0.0666	pCi/g	11/15/18 13:07	11/26/18 11:39	1
Pu-239/240	-0.010	U	0.0257	0.0257	1.00	0.0797	pCi/g	11/15/18 13:07	11/26/18 11:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*105*		*30 - 105*	*11/15/18 13:07*	*11/26/18 11:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0840**		0.0686	0.0699	1.00	0.0514	pCi/g	11/15/18 14:05	11/20/18 15:35	1
U-233/234	**0.0975**		0.0741	0.0757	1.00	0.0514	pCi/g	11/15/18 14:05	11/20/18 15:35	1
U-235/236	0.000	U	0.0280	0.0280	1.00	0.0514	pCi/g	11/15/18 14:05	11/20/18 15:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*89.8*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:35*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.45	U	0.0505	1.23	15.0	2.04	pCi/g	11/15/18 14:03	11/29/18 19:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*11/15/18 14:03*	*11/29/18 19:01*	*1*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8711-1	B3KL29	85.4
300-8711-2	B3KL38	95.7
300-8711-2 DU	B3KL38	102
300-8711-3	B3KL27	96.3
300-8711-4	B3KL28	85.6
300-8711-5	B3KL26	93.2
300-8711-6	B3KL22	102
300-8711-7	B3KL25	101
300-8711-8	B3KL24	101
300-8711-9	B3KL23	105
LCS 300-15882/2-A	Lab Control Sample	96.5
MB 300-15882/1-A	Method Blank	106 X

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8711-1	B3KL29	49.2
300-8711-2	B3KL38	51.1
300-8711-3	B3KL27	69.8
300-8711-3 DU	B3KL27	78.7
300-8711-4	B3KL28	73.6
300-8711-5	B3KL26	61.8
300-8711-6	B3KL22	72.3
300-8711-7	B3KL25	81.7
300-8711-8	B3KL24	64.9
300-8711-9	B3KL23	89.8
LCS 300-15887/2-A	Lab Control Sample	27.7 X
MB 300-15887/1-A	Method Blank	51.8

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8711-1	B3KL29	85.4
300-8711-2	B3KL38	95.7
300-8711-2 DU	B3KL38	102
300-8711-3	B3KL27	96.3
300-8711-4	B3KL28	85.6
300-8711-5	B3KL26	93.2

Percent Yield (Acceptance Limits)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8711-6	B3KL22	102							
300-8711-7	B3KL25	101							
300-8711-8	B3KL24	101							
300-8711-9	B3KL23	105							
LCS 300-15886/2-A	Lab Control Sample	96.5							
MB 300-15886/1-A	Method Blank	106							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15872/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0344	U		0.0833	0.370	0.0487	pCi/g	11/15/18 10:56	11/16/18 08:47	1

Lab Sample ID: LCS 300-15872/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.65	2.922		0.222	0.370	0.114	pCi/g	110	80 - 120		

Lab Sample ID: 300-8711-1 DU — **Client Sample ID: B3KL29**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.029	U		0.0235	U y	0.0929	0.370	0.0992	pCi/g			2088	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15887/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16025 — **Prep Batch: 15887**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00925	U	0.0424	0.0424	1.00	0.110	pCi/g	11/15/18 14:05	11/20/18 15:31	1
U-233/234	-0.00336	U	0.0422	0.0422	1.00	0.0913	pCi/g	11/15/18 14:05	11/20/18 15:31	1
U-235/236	-0.00168	U	0.0421	0.0421	1.00	0.0830	pCi/g	11/15/18 14:05	11/20/18 15:31	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*51.8*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:31*	*1*

Lab Sample ID: LCS 300-15887/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16025 — **Prep Batch: 15887**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			1.85	1.646		0.658	1.00	0.194	pCi/g	89	80 - 120		
U-233/234			1.76	1.778		0.693	1.00	0.201	pCi/g	101	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*27.7*	*X*	*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8711-3 DU — **Client Sample ID: B3KL27**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16025 — **Prep Batch: 15887**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.182			0.159		0.0999	1.00	0.0576	pCi/g			13	30
U-233/234	0.0967			0.159	y	0.0999	1.00	0.0576	pCi/g			49	30
U-235/236	-0.0028	U		-0.000583	U y	0.0292	1.00	0.0535	pCi/g			131	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*78.7*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15882/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16100 — **Prep Batch: 15882**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0120	U	0.0288	0.0288	1.00	0.0659	pCi/g	11/15/18 13:07	11/20/18 15:29	1
Pu-239/240	-0.00287	U	0.0288	0.0288	1.00	0.0684	pCi/g	11/15/18 13:07	11/20/18 15:29	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*106*	*X*	*30 - 105*	*11/15/18 13:07*	*11/20/18 15:29*	*1*

Lab Sample ID: LCS 300-15882/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16100 — **Prep Batch: 15882**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.890	1.042		0.289	1.00	0.0510	pCi/g	117	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*96.5*		*30 - 105*

Lab Sample ID: 300-8711-2 DU — **Client Sample ID: B3KL38**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16100 — **Prep Batch: 15882**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0287	U		0.000513	U y	0.0262	1.00	0.0822	pCi/g			193	30
Pu-239/240	-0.0016	U		0.0113	U y	0.0258	1.00	0.0544	pCi/g			267	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*102*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15886/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.257	U	0.0703	1.40	15.0	2.28	pCi/g	11/15/18 14:03	11/28/18 18:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*106*			*11/15/18 14:03*	*11/28/18 18:32*	*1*

Lab Sample ID: LCS 300-15886/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			221	209.9		13.5	15.0	2.21	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*96.5*		

Lab Sample ID: 300-8711-2 DU — **Client Sample ID: B3KL38**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	3.62			1.931	U y	1.36	15.0	2.02	pCi/g			61	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*102*		

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

General Chemistry

Analysis Batch: 15921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-1	B3KL29	Total/NA	Solid	Moisture	
300-8711-2	B3KL38	Total/NA	Solid	Moisture	
300-8711-3	B3KL27	Total/NA	Solid	Moisture	
300-8711-4	B3KL28	Total/NA	Solid	Moisture	
300-8711-5	B3KL26	Total/NA	Solid	Moisture	
300-8711-6	B3KL22	Total/NA	Solid	Moisture	
300-8711-7	B3KL25	Total/NA	Solid	Moisture	
300-8711-8	B3KL24	Total/NA	Solid	Moisture	
300-8711-9	B3KL23	Total/NA	Solid	Moisture	

Rad

Prep Batch: 15872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-1	B3KL29	Total/NA	Solid	Direct Addition	
300-8711-2	B3KL38	Total/NA	Solid	Direct Addition	
300-8711-3	B3KL27	Total/NA	Solid	Direct Addition	
300-8711-4	B3KL28	Total/NA	Solid	Direct Addition	
300-8711-5	B3KL26	Total/NA	Solid	Direct Addition	
300-8711-6	B3KL22	Total/NA	Solid	Direct Addition	
300-8711-7	B3KL25	Total/NA	Solid	Direct Addition	
300-8711-8	B3KL24	Total/NA	Solid	Direct Addition	
300-8711-9	B3KL23	Total/NA	Solid	Direct Addition	
MB 300-15872/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-15872/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8711-1 DU	B3KL29	Total/NA	Solid	Direct Addition	

Prep Batch: 15882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-1	B3KL29	Total/NA	Solid	ExtChrAct	
300-8711-2	B3KL38	Total/NA	Solid	ExtChrAct	
300-8711-3	B3KL27	Total/NA	Solid	ExtChrAct	
300-8711-4	B3KL28	Total/NA	Solid	ExtChrAct	
300-8711-5	B3KL26	Total/NA	Solid	ExtChrAct	
300-8711-6	B3KL22	Total/NA	Solid	ExtChrAct	
300-8711-7	B3KL25	Total/NA	Solid	ExtChrAct	
300-8711-8	B3KL24	Total/NA	Solid	ExtChrAct	
300-8711-9	B3KL23	Total/NA	Solid	ExtChrAct	
MB 300-15882/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-15882/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8711-2 DU	B3KL38	Total/NA	Solid	ExtChrAct	

Prep Batch: 15886

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-1	B3KL29	Total/NA	Solid	ExtChr_LSC	
300-8711-2	B3KL38	Total/NA	Solid	ExtChr_LSC	
300-8711-3	B3KL27	Total/NA	Solid	ExtChr_LSC	
300-8711-4	B3KL28	Total/NA	Solid	ExtChr_LSC	
300-8711-5	B3KL26	Total/NA	Solid	ExtChr_LSC	
300-8711-6	B3KL22	Total/NA	Solid	ExtChr_LSC	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Rad (Continued)

Prep Batch: 15886 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-7	B3KL25	Total/NA	Solid	ExtChr_LSC	
300-8711-8	B3KL24	Total/NA	Solid	ExtChr_LSC	
300-8711-9	B3KL23	Total/NA	Solid	ExtChr_LSC	
MB 300-15886/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-15886/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8711-2 DU	B3KL38	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 15887

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8711-1	B3KL29	Total/NA	Solid	ExtChrAct	
300-8711-2	B3KL38	Total/NA	Solid	ExtChrAct	
300-8711-3	B3KL27	Total/NA	Solid	ExtChrAct	
300-8711-4	B3KL28	Total/NA	Solid	ExtChrAct	
300-8711-5	B3KL26	Total/NA	Solid	ExtChrAct	
300-8711-6	B3KL22	Total/NA	Solid	ExtChrAct	
300-8711-7	B3KL25	Total/NA	Solid	ExtChrAct	
300-8711-8	B3KL24	Total/NA	Solid	ExtChrAct	
300-8711-9	B3KL23	Total/NA	Solid	ExtChrAct	
MB 300-15887/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-15887/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8711-3 DU	B3KL27	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL29

Lab Sample ID: 300-8711-1

Date Collected: 11/13/18 12:56

Matrix: Solid

Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	356.38 g	356.38 g	16015	11/16/18 10:30	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16025	11/20/18 15:32	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16100	11/21/18 16:05	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.23 g	1.23 g	16232	11/28/18 22:37	DJ	TAL RCH

Client Sample ID: B3KL38

Lab Sample ID: 300-8711-2

Date Collected: 11/13/18 08:51

Matrix: Solid

Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	385.9 g	385.9 g	16015	11/16/18 10:31	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	16025	11/20/18 15:32	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16100	11/21/18 16:06	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.1 g	1.1 g	16232	11/29/18 00:39	DJ	TAL RCH

Client Sample ID: B3KL27

Lab Sample ID: 300-8711-3

Date Collected: 11/13/18 11:06

Matrix: Solid

Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	340.28 g	340.28 g	16015	11/16/18 10:32	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.24 g	1.24 g	16025	11/20/18 15:32	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16100	11/21/18 16:07	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	16232	11/29/18 04:44	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL28

Lab Sample ID: 300-8711-4

Date Collected: 11/13/18 12:30
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	364.99 g	364.99 g	16015	11/16/18 10:31	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16025	11/20/18 15:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	16100	11/21/18 16:08	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.16 g	1.16 g	16232	11/29/18 08:49	DJ	TAL RCH

Client Sample ID: B3KL26

Lab Sample ID: 300-8711-5

Date Collected: 11/13/18 10:40
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	384.78 g	384.78 g	16015	11/16/18 12:12	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16025	11/20/18 15:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16100	11/21/18 16:08	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.12 g	1.12 g	16232	11/29/18 10:52	DJ	TAL RCH

Client Sample ID: B3KL22

Lab Sample ID: 300-8711-6

Date Collected: 11/13/18 08:51
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	363.65 g	363.65 g	16015	11/16/18 12:13	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	16025	11/20/18 15:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16100	11/21/18 16:08	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	16232	11/29/18 12:54	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Client Sample ID: B3KL25

Lab Sample ID: 300-8711-7

Date Collected: 11/13/18 09:53
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	351.97 g	351.97 g	16015	11/16/18 12:13	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16025	11/20/18 15:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16100	11/26/18 11:39	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	16232	11/29/18 14:57	DJ	TAL RCH

Client Sample ID: B3KL24

Lab Sample ID: 300-8711-8

Date Collected: 11/13/18 09:29
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	332.45 g	332.45 g	16015	11/16/18 12:14	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	16025	11/20/18 15:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16100	11/26/18 11:39	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1 g	1 g	16232	11/29/18 16:59	DJ	TAL RCH

Client Sample ID: B3KL23

Lab Sample ID: 300-8711-9

Date Collected: 11/13/18 10:18
Matrix: Solid
Date Received: 11/14/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15921	11/16/18 14:54	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15872	11/15/18 10:56	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.36 g	358.36 g	16015	11/16/18 12:14	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15887	11/15/18 14:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16025	11/20/18 15:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15882	11/15/18 13:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16100	11/26/18 11:39	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15886	11/15/18 14:03	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.05 g	1.05 g	16232	11/29/18 19:01	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8711-1	B3KL29	Solid	11/13/18 12:56	11/14/18 09:25
300-8711-2	B3KL38	Solid	11/13/18 08:51	11/14/18 09:25
300-8711-3	B3KL27	Solid	11/13/18 11:06	11/14/18 09:25
300-8711-4	B3KL28	Solid	11/13/18 12:30	11/14/18 09:25
300-8711-5	B3KL26	Solid	11/13/18 10:40	11/14/18 09:25
300-8711-6	B3KL22	Solid	11/13/18 08:51	11/14/18 09:25
300-8711-7	B3KL25	Solid	11/13/18 09:53	11/14/18 09:25
300-8711-8	B3KL24	Solid	11/13/18 09:29	11/14/18 09:25
300-8711-9	B3KL23	Solid	11/13/18 10:18	11/14/18 09:25

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-010	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL Vault-7	**PROJECT DESIGNATION** RTL Vault and 530 - Rad		**SAF NO.** F18-042	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL29	N/A	SOIL	NOV 1 3 2018	1256	✓	✓

RL8711-1

8711

300-8711 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 1 3 2018 1415	SSU-1	NOV 1 3 2018 1415
SSU-1	NOV 1 4 2018 0720	Tim Calloway /CHPRC	NOV 1 4 2018 0720
Tim Calloway /CHPRC	NOV 1 4 2018 0425	Suzi Vitte TAM	NOV 1 4 2018 0425

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64743 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-019	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL Vault-DUP2	**PROJECT DESIGNATION** RTL Vault and 530 - Rad		**SAF NO.** F18-042	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-567 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL38	N/A	SOIL	NOV 13 2018	0851	✓	✓

RL 8711-1
8711-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 13 2018 1415	SSU-1	NOV 13 2018 1415
SSU-1	NOV 14 2018 0720	Tim Callaway /CHPRC	NOV 14 2018 0720
Tim Callaway /CHPRC	NOV 14 2018 0925	SUZI VITE TARL	NOV 14 2018 0925

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64752 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-008	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL Vault-5	**PROJECT DESIGNATION** RTL Vault and 530 - Rad		**SAF NO.** F18-042	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL27	N/A	SOIL	NOV 1 3 2018	1106	✓	✓

RL8711-1
8711

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 1 3 2018 1415	SSU-1	NOV 1 3 2018 1415
SSU-1	NOV 1 4 2018 0720	Tim Calloway /CHPRC	NOV 1 4 2018 0720
Tim Calloway /CHPRC	NOV 1 4 2018 0925	Suzi Vitt	NOV 1 4 2018 0925

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64741 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-009	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL Vault-6	**PROJECT DESIGNATION** RTL Vault and 530 - Rad		**SAF NO.** F18-042	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL28	N/A	SOIL	NOV 1 3 2018	1230	✓	✓

RL 8711-1
8711

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 1 3 2018 1415	SSU-1	NOV 1 3 2018 1415
SSU-1	NOV 1 4 2018 0720	Tim Calloway /CHPRC T. Calloway	NOV 1 4 2018 0720
Tim Calloway /CHPRC T Calloway	NOV 1 4 2018 0425	SSU-1 SJD TAM	NOV 1 4 2018 0425

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64742 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-007	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL Vault-4	**PROJECT DESIGNATION** RTL Vault and 530 - Rad		**SAF NO.** F18-042	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** ~~HNF-N~~ 50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL26	N/A	SOIL	NOV 1 3 2018	1040	✓	✓

RL8711-1

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CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 1 3 2018 1415	SSU-1	NOV 1 3 2018 1415
SSU-1	NOV 1 4 2018 0720	Tim Callaway /CHPRC T. Callaway	NOV 1 4 2018 0720
Tim Callaway /CHPRC T Callaway	NOV 1 4 2018 0925	S.V. Tate	NOV 1 4 2018 0925

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64740 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-003	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault and 530 J-17	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL22	N/A	SOIL	NOV 13 2018	0851	✓	✓

RL8711-1
8711

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MCC	NOV 13 2018 1415	SSU-1	NOV 13 2018 1415
SSU-1	NOV 14 2018 0720	Tim Calloway /CHPRC	NOV 14 2018 0720
Tim Calloway /CHPRC	NOV 14 2018 0425	S. Vipe Jr TRVL	NOV 14 2018 0425

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64736 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-006	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-3	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL25	N/A	SOIL	NOV 13 2018	0953	✓	✓

RL8711-1

8711

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 13 2018 1415	SSU-1	NOV 13 2018 1415
SSU-1	NOV 14 2018 0720	Tim Calloway /CHPRC	NOV 14 2018 0720
Tim Calloway /CHPRC	NOV 14 2018 0425	SSU-1	NOV 14 2018 0425

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64739 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-005	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Vault-2	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33KL24	N/A	SOIL	NOV 13 2018	0929	✓	✓

RL8711-1

8711-

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRCh	NOV 13 2018 1415	SSU-1	NOV 13 2018 1415
SSU-1	NOV 14 2018 0720	Tim Calloway /CHPRC TCalloway	NOV 14 2018 0720
Tim Calloway /CHPRC TCalloway	NOV 14 2018 0425	S. Vitte	NOV 14 2018 0425

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64738 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-004	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-1	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL23	N/A	SOIL	NOV 1 3 2018	1018	✓	✓

RL8711-1

8711

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 1 3 2018 1415	SSU-1	NOV 1 3 2018 1415
SSU-1 Tim Calloway /CHPRC	NOV 1 4 2018 0720	Tim Calloway /CHPRC	NOV 1 4 2018 0720
	NOV 1 4 2018 0725	S.VITTE SIW	NOV 1 4 2018 0725

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64737 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8711-1
SDG Number: RL8711-1

Login Number: 8711
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8745-1
TestAmerica Sample Delivery Group: RL8745-1
Client Project/Site: F18-042

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/19/2018 12:27:42 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8745-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8745-1

Comments
No additional comments.

Receipt
The samples were received on 11/15/2018 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL31
Date Collected: 11/14/18 08:14
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.038	U		0.114	0.370	0.0933	pCi/g	11/20/18 13:49	11/20/18 16:59	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0036	U	0.0229	0.0229	1.00	0.0558	pCi/g	11/23/18 08:44	12/04/18 10:20	1
Pu-239/240	-0.0091	U o	0.0231	0.0232	1.00	0.0684	pCi/g	11/23/18 08:44	12/04/18 10:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.5*		*30 - 105*	*11/23/18 08:44*	*12/04/18 10:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0731**		0.0618	0.0628	1.00	0.0567	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-233/234	**0.138**		0.0836	0.0862	1.00	0.0498	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-235/236	0.0121	U	0.0252	0.0253	1.00	0.0463	pCi/g	11/23/18 10:04	12/03/18 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*85.9*		*30 - 105*	*11/23/18 10:04*	*12/03/18 11:49*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.96	U	0.0770	1.03	15.0	1.75	pCi/g	11/23/18 09:46	12/11/18 21:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.5*			*11/23/18 09:46*	*12/11/18 21:52*	*1*

Client Sample ID: B3KL35
Date Collected: 11/14/18 08:51
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0043	U		0.0916	0.370	0.0860	pCi/g	11/20/18 13:49	11/21/18 08:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00062	U	0.0308	0.0308	1.00	0.0566	pCi/g	11/23/18 08:44	12/04/18 10:20	1
Pu-239/240	-0.0018	U o	0.0309	0.0309	1.00	0.0641	pCi/g	11/23/18 08:44	12/04/18 10:20	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL35
Date Collected: 11/14/18 08:51
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-2
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	97.5		30 - 105	11/23/18 08:44	12/04/18 10:20	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0124	U	0.0295	0.0296	1.00	0.0638	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-233/234	**0.116**		0.0832	0.0853	1.00	0.0581	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-235/236	-0.00059	U	0.0294	0.0294	1.00	0.0540	pCi/g	11/23/18 10:04	12/03/18 11:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	74.7		30 - 105	11/23/18 10:04	12/03/18 11:49	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.81	U	0.0695	1.17	15.0	1.95	pCi/g	11/23/18 09:46	12/12/18 01:56	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	97.5			11/23/18 09:46	12/12/18 01:56	1

Client Sample ID: B3KL36
Date Collected: 11/14/18 09:06
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-3
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0286	U		0.0743	0.370	0.0870	pCi/g	11/20/18 13:49	11/21/18 08:35	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0049	U	0.0226	0.0226	1.00	0.0585	pCi/g	11/23/18 08:44	12/04/18 10:22	1
Pu-239/240	0.00985	U o	0.0224	0.0225	1.00	0.0466	pCi/g	11/23/18 08:44	12/04/18 10:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	94.4		30 - 105	11/23/18 08:44	12/04/18 10:22	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0992**		0.0708	0.0726	1.00	0.0494	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-233/234	**0.111**		0.0752	0.0772	1.00	0.0544	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-235/236	0.000	U	0.0251	0.0251	1.00	0.0460	pCi/g	11/23/18 10:04	12/03/18 11:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	78.6		30 - 105	11/23/18 10:04	12/03/18 11:49	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL36
Date Collected: 11/14/18 09:06
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-3
Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.4	U	0.103	0.920	15.0	1.60	pCi/g	11/23/18 09:46	12/12/18 03:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.4*			*11/23/18 09:46*	*12/12/18 03:58*	*1*

Client Sample ID: B3KL34
Date Collected: 11/14/18 08:32
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-4
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0018	U		0.0978	0.370	0.0934	pCi/g	11/20/18 13:49	11/21/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0037	U	0.0306	0.0306	1.00	0.0707	pCi/g	11/23/18 08:44	12/04/18 10:22	1
Pu-239/240	0.0146	U o	0.0304	0.0305	1.00	0.0558	pCi/g	11/23/18 08:44	12/04/18 10:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*85.3*		*30 - 105*	*11/23/18 08:44*	*12/04/18 10:22*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.180**		0.0874	0.0917	1.00	0.0389	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-233/234	**0.116**		0.0703	0.0726	1.00	0.0419	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-235/236	0.00975	U	0.0212	0.0213	1.00	0.0419	pCi/g	11/23/18 10:04	12/03/18 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*91.9*		*30 - 105*	*11/23/18 10:04*	*12/03/18 11:49*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.54	U	0.0383	1.43	15.0	2.36	pCi/g	11/23/18 09:46	12/12/18 06:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.3*			*11/23/18 09:46*	*12/12/18 06:01*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL30

Date Collected: 11/14/18 07:58
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8745-5

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0085	U		0.0919	0.370	0.0896	pCi/g	11/20/18 13:49	11/21/18 08:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00633	U	0.0246	0.0246	1.00	0.0648	pCi/g	11/23/18 08:44	12/04/18 10:22	1
Pu-239/240	-0.0015	U o	0.0244	0.0244	1.00	0.0506	pCi/g	11/23/18 08:44	12/04/18 10:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*92.0*		*30 - 105*	*11/23/18 08:44*	*12/04/18 10:22*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.259**		0.126	0.132	1.00	0.0559	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-233/234	**0.150**		0.0963	0.0993	1.00	0.0634	pCi/g	11/23/18 10:04	12/03/18 11:49	1
U-235/236	0.000	U	0.0305	0.0305	1.00	0.0559	pCi/g	11/23/18 10:04	12/03/18 11:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*82.0*		*30 - 105*	*11/23/18 10:04*	*12/03/18 11:49*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.3	U	0.0883	1.02	15.0	1.75	pCi/g	11/23/18 09:46	12/12/18 08:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*92.0*			*11/23/18 09:46*	*12/12/18 08:03*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8745-1	B3KL31	99.5
300-8745-1 DU	B3KL31	103
300-8745-2	B3KL35	97.5
300-8745-3	B3KL36	94.4
300-8745-4	B3KL34	85.3
300-8745-5	B3KL30	92.0
MB 300-16032/1-A	Method Blank	91.5

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8745-1	B3KL31	85.9
300-8745-1 DU	B3KL31	62.5
300-8745-2	B3KL35	74.7
300-8745-3	B3KL36	78.6
300-8745-4	B3KL34	91.9
300-8745-5	B3KL30	82.0
LCS 300-16046/2-A	Lab Control Sample	81.7
MB 300-16046/1-A	Method Blank	57.7

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8745-1	B3KL31	99.5
300-8745-1 DU	B3KL31	103
300-8745-2	B3KL35	97.5
300-8745-3	B3KL36	94.4
300-8745-4	B3KL34	85.3
300-8745-5	B3KL30	92.0
LCS 300-16035/2-A	Lab Control Sample	98.8
MB 300-16035/1-A	Method Blank	91.5

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15971/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16516 — **Prep Batch: 15971**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00378	U		0.00756	0.370	0.0293	pCi/g	11/20/18 13:49	11/20/18 17:00	1

Lab Sample ID: LCS 300-15971/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16516 — **Prep Batch: 15971**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.65	2.494		0.192	0.370	0.0868	pCi/g	94	80 - 120		

Lab Sample ID: 300-8745-1 DU — **Client Sample ID: B3KL31**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16516 — **Prep Batch: 15971**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.038	U		0.0255	U y	0.0961	0.370	0.104	pCi/g			1020	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16046/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16295 — **Prep Batch: 16046**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0170	U	0.0642	0.0642	1.00	0.151	pCi/g	11/23/18 10:04	12/03/18 11:48	1
U-233/234	-0.00359	U	0.0450	0.0450	1.00	0.0973	pCi/g	11/23/18 10:04	12/03/18 11:48	1
U-235/236	-0.000897	U	0.0449	0.0449	1.00	0.0823	pCi/g	11/23/18 10:04	12/03/18 11:48	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*57.7*		*30 - 105*	*11/23/18 10:04*	*12/03/18 11:48*	*1*

Lab Sample ID: LCS 300-16046/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16295 — **Prep Batch: 16046**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			1.81	1.873		0.446	1.00	0.0587	pCi/g	103	80 - 120		
U-233/234			1.73	2.050		0.476	1.00	0.0669	pCi/g	118	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*81.7*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8745-1 DU — **Client Sample ID: B3KL31**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16295 — **Prep Batch: 16046**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0731			0.0807	U	0.0866	1.00	0.113	pCi/g			10	30
U-233/234	0.138			0.0876	U y	0.0867	1.00	0.0975	pCi/g			44	30
U-235/236	0.0121	U		-0.00152	U y	0.0381	1.00	0.0752	pCi/g			258	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*62.5*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16032/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16338 — **Prep Batch: 16032**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00288	U	0.0361	0.0361	1.00	0.0781	pCi/g	11/23/18 08:44	12/04/18 10:19	1
Pu-239/240	-0.00432	U	0.0361	0.0361	1.00	0.0835	pCi/g	11/23/18 08:44	12/04/18 10:19	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.5*		*30 - 105*	*11/23/18 08:44*	*12/04/18 10:19*	*1*

Lab Sample ID: LCS 300-16032/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16338 — **Prep Batch: 16032**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			1.11	1.032		0.343	1.00	0.0821	pCi/g	93	80 - 120		

Lab Sample ID: 300-8745-1 DU — **Client Sample ID: B3KL31**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16338 — **Prep Batch: 16032**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0036	U		-0.00297	U	0.0249	1.00	0.0591	pCi/g			20	30
Pu-239/240	-0.0091	U o		-0.00297	U o y	0.0249	1.00	0.0591	pCi/g			102	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*103*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16035/1-A
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16035

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.758	U	0.0744	1.40	15.0	2.32	pCi/g	11/23/18 09:46	12/11/18 17:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.5*			*11/23/18 09:46*	*12/11/18 17:47*	*1*

Lab Sample ID: LCS 300-16035/2-A
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16035

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	242.6		15.6	15.0	2.15	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*98.8*		

Lab Sample ID: 300-8745-1 DU
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: B3KL31
Prep Type: Total/NA
Prep Batch: 16035

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.96	U		-0.546	U y	1.16	15.0	1.92	pCi/g			55	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*103*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

General Chemistry

Analysis Batch: 15969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1	B3KL31	Total/NA	Solid	Moisture	
300-8745-2	B3KL35	Total/NA	Solid	Moisture	
300-8745-3	B3KL36	Total/NA	Solid	Moisture	
300-8745-4	B3KL34	Total/NA	Solid	Moisture	
300-8745-5	B3KL30	Total/NA	Solid	Moisture	

Rad

Prep Batch: 15971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1	B3KL31	Total/NA	Solid	Direct Addition	
300-8745-2	B3KL35	Total/NA	Solid	Direct Addition	
300-8745-3	B3KL36	Total/NA	Solid	Direct Addition	
300-8745-4	B3KL34	Total/NA	Solid	Direct Addition	
300-8745-5	B3KL30	Total/NA	Solid	Direct Addition	
MB 300-15971/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-15971/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8745-1 DU	B3KL31	Total/NA	Solid	Direct Addition	

Prep Batch: 16032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1	B3KL31	Total/NA	Solid	ExtChrAct	
300-8745-2	B3KL35	Total/NA	Solid	ExtChrAct	
300-8745-3	B3KL36	Total/NA	Solid	ExtChrAct	
300-8745-4	B3KL34	Total/NA	Solid	ExtChrAct	
300-8745-5	B3KL30	Total/NA	Solid	ExtChrAct	
MB 300-16032/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16032/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8745-1 DU	B3KL31	Total/NA	Solid	ExtChrAct	

Prep Batch: 16035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1	B3KL31	Total/NA	Solid	ExtChr_LSC	
300-8745-2	B3KL35	Total/NA	Solid	ExtChr_LSC	
300-8745-3	B3KL36	Total/NA	Solid	ExtChr_LSC	
300-8745-4	B3KL34	Total/NA	Solid	ExtChr_LSC	
300-8745-5	B3KL30	Total/NA	Solid	ExtChr_LSC	
MB 300-16035/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16035/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8745-1 DU	B3KL31	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16046

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1	B3KL31	Total/NA	Solid	ExtChrAct	
300-8745-2	B3KL35	Total/NA	Solid	ExtChrAct	
300-8745-3	B3KL36	Total/NA	Solid	ExtChrAct	
300-8745-4	B3KL34	Total/NA	Solid	ExtChrAct	
300-8745-5	B3KL30	Total/NA	Solid	ExtChrAct	
MB 300-16046/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16046/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Rad (Continued)

Prep Batch: 16046 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8745-1 DU	B3KL31	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL31

Lab Sample ID: 300-8745-1
Date Collected: 11/14/18 08:14
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15969	11/20/18 12:51	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15971	11/20/18 13:49	TDA	TAL RCH
Total/NA	Analysis	901.1		1	343.75 g	343.75 g	16516	11/20/18 16:59	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16046	11/23/18 10:04	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16295	12/03/18 11:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16032	11/23/18 08:44	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16338	12/04/18 10:20	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16035	11/23/18 09:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.23 g	1.23 g	16728	12/11/18 21:52	DJ	TAL RCH

Client Sample ID: B3KL35

Lab Sample ID: 300-8745-2
Date Collected: 11/14/18 08:51
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15969	11/20/18 12:51	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15971	11/20/18 13:49	TDA	TAL RCH
Total/NA	Analysis	901.1		1	387.55 g	387.55 g	16516	11/21/18 08:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16046	11/23/18 10:04	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16295	12/03/18 11:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16032	11/23/18 08:44	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16338	12/04/18 10:20	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16035	11/23/18 09:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.12 g	1.12 g	16728	12/12/18 01:56	DJ	TAL RCH

Client Sample ID: B3KL36

Lab Sample ID: 300-8745-3
Date Collected: 11/14/18 09:06
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15969	11/20/18 12:51	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15971	11/20/18 13:49	TDA	TAL RCH
Total/NA	Analysis	901.1		1	381.26 g	381.26 g	16516	11/21/18 08:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16046	11/23/18 10:04	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.31 g	1.31 g	16295	12/03/18 11:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16032	11/23/18 08:44	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.41 g	1.41 g	16338	12/04/18 10:22	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16035	11/23/18 09:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.41 g	1.41 g	16728	12/12/18 03:58	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Client Sample ID: B3KL34

Lab Sample ID: 300-8745-4

Date Collected: 11/14/18 08:32
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15969	11/20/18 12:51	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15971	11/20/18 13:49	TDA	TAL RCH
Total/NA	Analysis	901.1		1	342.9 g	342.9 g	16516	11/21/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16046	11/23/18 10:04	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.33 g	1.33 g	16295	12/03/18 11:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16032	11/23/18 08:44	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16338	12/04/18 10:22	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16035	11/23/18 09:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16728	12/12/18 06:01	DJ	TAL RCH

Client Sample ID: B3KL30

Lab Sample ID: 300-8745-5

Date Collected: 11/14/18 07:58
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15969	11/20/18 12:51	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15971	11/20/18 13:49	TDA	TAL RCH
Total/NA	Analysis	901.1		1	388.36 g	388.36 g	16516	11/21/18 08:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16046	11/23/18 10:04	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16295	12/03/18 11:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16032	11/23/18 08:44	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.32 g	1.32 g	16338	12/04/18 10:22	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16035	11/23/18 09:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.32 g	1.32 g	16728	12/12/18 08:03	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8745-1	B3KL31	Solid	11/14/18 08:14	11/15/18 09:20
300-8745-2	B3KL35	Solid	11/14/18 08:51	11/15/18 09:20
300-8745-3	B3KL36	Solid	11/14/18 09:06	11/15/18 09:20
300-8745-4	B3KL34	Solid	11/14/18 08:32	11/15/18 09:20
300-8745-5	B3KL30	Solid	11/14/18 07:58	11/15/18 09:20

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-012	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-9	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

300-8745 COC

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL31	N/A	SOIL	NOV 14 2018	0814	✓	✓

RL8745-1
~~RL8718-1~~
~~8718~~ CW 11-16-18

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1 Lesly Wall /CHPRC	NOV 14 2018 1500
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800		NOV 15 2018 0800
	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64745 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-016	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-13	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL35	N/A	SOIL	NOV 14 2018	0851	✓	✓

~~RLB718~~ + aaw
~~8718~~ 11-16-18

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64749 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-017	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Vault-14	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL36	N/A	SOIL	NOV 14 2018	0906	✓	✓

~~RL8718-1~~
~~8718~~ aw 11-16-18

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1530	SSU-1	NOV 14 2018 1530
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Hoim TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64750 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-015	PAGE 1 OF 1
COLLECTOR: Kevin Patterson CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Vault-12	PROJECT DESIGNATION: RTL Vault and 530 - Rad		SAF NO.: F18-042	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL34	N/A	SOIL	NOV 14 2018	0832	✓	✓

~~RL8718-1~~
~~8718~~ aw 11-16-18

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-162
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64748 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-042-011	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Vault-8	PROJECT DESIGNATION RTL Vault and 530 - Rad		SAF NO. F18-042	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3KL30	N/A	SOIL	NOV 14 2018	0758	✓	✓

~~RL8418-1~~
~~0718~~ aw 11-16-18

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500	TRVL-18-162 (1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800	
	NOV 15 2018 0920	T. Holm/ TARL	NOV 15 2018 0920	

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 9/27/2018 FSR ID = FSR64744 TRVL NUM = TRVL-18-162 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8745-1
SDG Number: RL8745-1

Login Number: 8745
List Number: 1
Creator: Worthy, Ashley L

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8868-1
TestAmerica Sample Delivery Group: RL8868-1
Client Project/Site: F18-044

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
1/9/2019 12:04:08 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8868-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8868-1

Comments
No additional comments.

Receipt
The samples were received on 12/4/2018 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Client Sample ID: B3L267
Date Collected: 12/03/18 08:11
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8868-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.031	U		0.0924	0.370	0.0801	pCi/g	12/07/18 14:07	12/20/18 09:35	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0030	U	0.0253	0.0253	1.00	0.0584	pCi/g	12/14/18 09:28	12/20/18 10:35	1
Pu-239/240	-0.0045	U	0.0253	0.0253	1.00	0.0630	pCi/g	12/14/18 09:28	12/20/18 10:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.5*		*30 - 105*	*12/14/18 09:28*	*12/20/18 10:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.171**		0.108	0.112	1.00	0.0627	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-233/234	**0.171**		0.108	0.112	1.00	0.0627	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-235/236	-0.00068	U	0.0342	0.0342	1.00	0.0627	pCi/g	12/14/18 16:09	12/26/18 10:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*70.3*		*30 - 105*	*12/14/18 16:09*	*12/26/18 10:11*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.606	U	0.118	1.51	15.0	2.79	pCi/g	12/14/18 15:49	12/24/18 18:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.5*			*12/14/18 15:49*	*12/24/18 18:34*	*1*

Client Sample ID: B3L279
Date Collected: 12/03/18 09:09
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8868-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0609	U		0.125	0.370	0.136	pCi/g	12/07/18 14:07	12/20/18 10:28	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0061	U	0.0278	0.0278	1.00	0.0720	pCi/g	12/14/18 09:28	12/20/18 10:33	1
Pu-239/240	-0.0011	U	0.0276	0.0276	1.00	0.0544	pCi/g	12/14/18 09:28	12/20/18 10:33	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Client Sample ID: B3L279
Date Collected: 12/03/18 09:09
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8868-2
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	96.0		30 - 105	12/14/18 09:28	12/20/18 10:33	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0829		0.0630	0.0643	1.00	0.0437	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-233/234	0.177		0.0923	0.0963	1.00	0.0517	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-235/236	-0.00048	U	0.0238	0.0238	1.00	0.0437	pCi/g	12/14/18 16:09	12/26/18 10:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	81.2		30 - 105	12/14/18 16:09	12/26/18 10:11	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.02	U	0.149	1.56	15.0	2.82	pCi/g	12/14/18 15:49	12/24/18 20:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	96.0			12/14/18 15:49	12/24/18 20:44	1

Client Sample ID: B3L266
Date Collected: 12/03/18 09:58
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8868-3
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0414	U		0.0768	0.370	0.0909	pCi/g	12/07/18 14:07	12/20/18 10:28	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0037	U	0.0371	0.0371	1.00	0.0831	pCi/g	12/14/18 09:28	12/20/18 10:33	1
Pu-239/240	-0.0015	U	0.0370	0.0370	1.00	0.0729	pCi/g	12/14/18 09:28	12/20/18 10:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	71.5		30 - 105	12/14/18 09:28	12/20/18 10:33	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.101		0.0899	0.0915	1.00	0.0738	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-233/234	0.139		0.106	0.109	1.00	0.0794	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-235/236	-0.00080	U	0.0402	0.0402	1.00	0.0738	pCi/g	12/14/18 16:09	12/26/18 10:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	65.7		30 - 105	12/14/18 16:09	12/26/18 10:11	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.49	U	0.242	2.17	15.0	3.86	pCi/g	12/14/18 15:49	12/24/18 21:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*71.5*			*12/14/18 15:49*	*12/24/18 21:49*	*1*

Client Sample ID: B3L268
Lab Sample ID: 300-8868-4

Date Collected: 12/03/18 08:43
Matrix: Solid
Date Received: 12/04/18 10:45

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.032	U		0.109	0.370	0.0908	pCi/g	12/07/18 14:07	12/20/18 10:29	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0015	U	0.0253	0.0253	1.00	0.0524	pCi/g	12/14/18 09:28	12/20/18 10:34	1
Pu-239/240	0.000	U	0.0252	0.0252	1.00	0.0462	pCi/g	12/14/18 09:28	12/20/18 10:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.7*		*30 - 105*	*12/14/18 09:28*	*12/20/18 10:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.112**		0.0915	0.0934	1.00	0.0686	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-233/234	**0.112**		0.0915	0.0934	1.00	0.0686	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-235/236	0.0172	U	0.0374	0.0375	1.00	0.0738	pCi/g	12/14/18 16:09	12/26/18 10:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*69.4*		*30 - 105*	*12/14/18 16:09*	*12/26/18 10:11*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.689	U	0.0781	1.48	15.0	2.73	pCi/g	12/14/18 15:49	12/24/18 22:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.7*			*12/14/18 15:49*	*12/24/18 22:54*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Client Sample ID: B3L264
Date Collected: 12/03/18 09:09
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8868-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0021	U		0.0907	0.370	0.0891	pCi/g	12/07/18 14:07	12/20/18 10:29	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0040	U	0.0221	0.0221	1.00	0.0551	pCi/g	12/14/18 09:28	12/20/18 10:34	1
Pu-239/240	0.000	U	0.0220	0.0220	1.00	0.0403	pCi/g	12/14/18 09:28	12/20/18 10:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.7*		*30 - 105*	*12/14/18 09:28*	*12/20/18 10:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0693**		0.0700	0.0709	1.00	0.0643	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-233/234	**0.0868**		0.0783	0.0795	1.00	0.0643	pCi/g	12/14/18 16:09	12/26/18 10:11	1
U-235/236	0.0175	U	0.0350	0.0352	1.00	0.0643	pCi/g	12/14/18 16:09	12/26/18 10:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*78.2*		*30 - 105*	*12/14/18 16:09*	*12/26/18 10:11*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.36	U	0.162	1.40	15.0	2.50	pCi/g	12/14/18 15:49	12/25/18 00:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.7*			*12/14/18 15:49*	*12/25/18 00:00*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8868-1	B3L267	99.5
300-8868-1 DU	B3L267	103
300-8868-2	B3L279	96.0
300-8868-3	B3L266	71.5
300-8868-4	B3L268	91.7
300-8868-5	B3L264	90.7
LCS 300-16650/2-A	Lab Control Sample	97.9
MB 300-16650/1-A	Method Blank	88.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8868-1	B3L267	70.3
300-8868-1 DU	B3L267	84.3
300-8868-2	B3L279	81.2
300-8868-3	B3L266	65.7
300-8868-4	B3L268	69.4
300-8868-5	B3L264	78.2
LCS 300-16670/2-B	Lab Control Sample	77.8
MB 300-16670/1-A	Method Blank	77.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8868-1	B3L267	99.5
300-8868-1 DU	B3L267	103
300-8868-2	B3L279	96.0
300-8868-3	B3L266	71.5
300-8868-4	B3L268	91.7
300-8868-5	B3L264	90.7
LCS 300-16669/2-A	Lab Control Sample	97.9
MB 300-16669/1-A	Method Blank	88.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16472/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0184	U		0.0684	0.370	0.0605	pCi/g	12/07/18 14:07	12/19/18 10:30	1

Lab Sample ID: LCS 300-16472/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.619		0.201	0.370	0.0906	pCi/g	100	80 - 120		

Lab Sample ID: 300-8868-1 DU — **Client Sample ID: B3L267**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.031	U		-0.0419	U	0.106	0.370	0.0828	pCi/g			28	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16670/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16964 — **Prep Batch: 16670**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.000	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1
U-233/234	-0.000655	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1
U-235/236	-0.000655	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*77.1*		*30 - 105*	*12/14/18 16:09*	*12/26/18 10:10*	*1*

Lab Sample ID: LCS 300-16670/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16964 — **Prep Batch: 16670**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.07	2.720		0.583	1.00	0.0762	pCi/g	88	80 - 120		
U-233/234			2.94	2.765		0.590	1.00	0.0671	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*77.8*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8868-1 DU — **Client Sample ID: B3L267**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16964 — **Prep Batch: 16670**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.171			0.0838	y	0.0707	1.00	0.0559	pCi/g			68	30
U-233/234	0.171			0.0697	y	0.0643	1.00	0.0559	pCi/g			84	30
U-235/236	-0.00068	U		0.0113	U y	0.0285	1.00	0.0637	pCi/g			226	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*84.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16650/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16863 — **Prep Batch: 16650**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00432	U	0.0362	0.0362	1.00	0.0836	pCi/g	12/14/18 09:28	12/20/18 10:35	1
Pu-239/240	-0.00432	U	0.0362	0.0362	1.00	0.0836	pCi/g	12/14/18 09:28	12/20/18 10:35	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.7*		*30 - 105*	*12/14/18 09:28*	*12/20/18 10:35*	*1*

Lab Sample ID: LCS 300-16650/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16863 — **Prep Batch: 16650**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.06	3.567		0.688	1.00	0.0748	pCi/g	88	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.9*		*30 - 105*

Lab Sample ID: 300-8868-1 DU — **Client Sample ID: B3L267**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16863 — **Prep Batch: 16650**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0030	U		-0.000567	U y	0.0284	1.00	0.0537	pCi/g			137	30
Pu-239/240	-0.0045	U		-0.00170	U y	0.0284	1.00	0.0608	pCi/g			91	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*103*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16669/1-A
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16669

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.189	U	0.0935	1.79	15.0	3.39	pCi/g	12/14/18 15:49	12/24/18 16:23	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.7*			*12/14/18 15:49*	*12/24/18 16:23*	*1*

Lab Sample ID: LCS 300-16669/2-A
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16669

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			195	182.4		12.4	15.0	2.71	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*97.9*		

Lab Sample ID: 300-8868-1 DU
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: B3L267
Prep Type: Total/NA
Prep Batch: 16669

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.606	U		0.773	U	1.49	15.0	2.72	pCi/g			24	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*103*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

General Chemistry

Analysis Batch: 16480

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8868-1	B3L267	Total/NA	Solid	Moisture	
300-8868-2	B3L279	Total/NA	Solid	Moisture	
300-8868-3	B3L266	Total/NA	Solid	Moisture	
300-8868-4	B3L268	Total/NA	Solid	Moisture	
300-8868-5	B3L264	Total/NA	Solid	Moisture	
300-8868-1 DU	B3L267	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16472

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8868-1	B3L267	Total/NA	Solid	Direct Addition	
300-8868-2	B3L279	Total/NA	Solid	Direct Addition	
300-8868-3	B3L266	Total/NA	Solid	Direct Addition	
300-8868-4	B3L268	Total/NA	Solid	Direct Addition	
300-8868-5	B3L264	Total/NA	Solid	Direct Addition	
MB 300-16472/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16472/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8868-1 DU	B3L267	Total/NA	Solid	Direct Addition	

Prep Batch: 16650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8868-1	B3L267	Total/NA	Solid	ExtChrAct	
300-8868-2	B3L279	Total/NA	Solid	ExtChrAct	
300-8868-3	B3L266	Total/NA	Solid	ExtChrAct	
300-8868-4	B3L268	Total/NA	Solid	ExtChrAct	
300-8868-5	B3L264	Total/NA	Solid	ExtChrAct	
MB 300-16650/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16650/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8868-1 DU	B3L267	Total/NA	Solid	ExtChrAct	

Prep Batch: 16669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8868-1	B3L267	Total/NA	Solid	ExtChr_LSC	
300-8868-2	B3L279	Total/NA	Solid	ExtChr_LSC	
300-8868-3	B3L266	Total/NA	Solid	ExtChr_LSC	
300-8868-4	B3L268	Total/NA	Solid	ExtChr_LSC	
300-8868-5	B3L264	Total/NA	Solid	ExtChr_LSC	
MB 300-16669/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16669/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8868-1 DU	B3L267	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8868-1	B3L267	Total/NA	Solid	ExtChrAct	
300-8868-2	B3L279	Total/NA	Solid	ExtChrAct	
300-8868-3	B3L266	Total/NA	Solid	ExtChrAct	
300-8868-4	B3L268	Total/NA	Solid	ExtChrAct	
300-8868-5	B3L264	Total/NA	Solid	ExtChrAct	
MB 300-16670/1-A	Method Blank	Total/NA	Solid	ExtChrAct	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Rad (Continued)

Prep Batch: 16670 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 300-16670/2-B	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8868-1 DU	B3L267	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Client Sample ID: B3L267

Lab Sample ID: 300-8868-1
Date Collected: 12/03/18 08:11
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16472	12/07/18 14:07	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.06 g	358.06 g	16859	12/20/18 09:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16650	12/14/18 09:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16863	12/20/18 10:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16670	12/14/18 16:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16964	12/26/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16669	12/14/18 15:49	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.13 g	1.13 g	17204	12/24/18 18:34	DJ	TAL RCH

Client Sample ID: B3L279

Lab Sample ID: 300-8868-2
Date Collected: 12/03/18 09:09
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16472	12/07/18 14:07	TDA	TAL RCH
Total/NA	Analysis	901.1		1	335.89 g	335.89 g	16859	12/20/18 10:28	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16650	12/14/18 09:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	16863	12/20/18 10:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16670	12/14/18 16:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.28 g	1.28 g	16964	12/26/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16669	12/14/18 15:49	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.15 g	1.15 g	17204	12/24/18 20:44	DJ	TAL RCH

Client Sample ID: B3L266

Lab Sample ID: 300-8868-3
Date Collected: 12/03/18 09:58
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16472	12/07/18 14:07	TDA	TAL RCH
Total/NA	Analysis	901.1		1	395.6 g	395.6 g	16859	12/20/18 10:28	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16650	12/14/18 09:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16863	12/20/18 10:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16670	12/14/18 16:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	16964	12/26/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16669	12/14/18 15:49	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.12 g	1.12 g	17204	12/24/18 21:49	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Client Sample ID: B3L268

Lab Sample ID: 300-8868-4

Date Collected: 12/03/18 08:43
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16472	12/07/18 14:07	TDA	TAL RCH
Total/NA	Analysis	901.1		1	339.61 g	339.61 g	16859	12/20/18 10:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16650	12/14/18 09:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.25 g	1.25 g	16863	12/20/18 10:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16670	12/14/18 16:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	16964	12/26/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16669	12/14/18 15:49	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.25 g	1.25 g	17204	12/24/18 22:54	DJ	TAL RCH

Client Sample ID: B3L264

Lab Sample ID: 300-8868-5

Date Collected: 12/03/18 09:09
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16472	12/07/18 14:07	TDA	TAL RCH
Total/NA	Analysis	901.1		1	366.74 g	366.74 g	16859	12/20/18 10:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16650	12/14/18 09:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.4 g	1.4 g	16863	12/20/18 10:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16670	12/14/18 16:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.93 g	0.93 g	16964	12/26/18 10:11	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16669	12/14/18 15:49	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.4 g	1.4 g	17204	12/25/18 00:00	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8868-1	B3L267	Solid	12/03/18 08:11	12/04/18 10:45
300-8868-2	B3L279	Solid	12/03/18 09:09	12/04/18 10:45
300-8868-3	B3L266	Solid	12/03/18 09:58	12/04/18 10:45
300-8868-4	B3L268	Solid	12/03/18 08:43	12/04/18 10:45
300-8868-5	B3L264	Solid	12/03/18 09:09	12/04/18 10:45

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-010	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB-3	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L267	N/A	SOIL	DEC 03 2018	0811	✓	✓

RL 8868-1

300-8868 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65525 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-022	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC		REQUIRED TAT: 15 Days
SAMPLING LOCATION: RTL OB DUP1	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L279	N/A	SOIL	DEC 03 2018	0909	✓	✓

RL 58661-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65537 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-009	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB-2	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L266	N/A	SOIL	DEC 03 2018	0958	✓	✓

RL8861-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65524 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-011	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB-4	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L268	N/A	SOIL	DEC 03 2018	0843	✓	✓

RL8868-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65526 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-007	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB J-24	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L264	N/A	SOIL	DEC 03 2018	0909	✓	✓

RL8868-1

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65522 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8868-1
SDG Number: RL8868-1

Login Number: 8868
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8903-1
TestAmerica Sample Delivery Group: RL8903-1
Client Project/Site: F18-044

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
1/4/2019 9:44:23 AM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8903-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8903-1

Comments
No additional comments.

Receipt
The samples were received on 12/5/2018 8:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method(s) ST-RC-0245: The laboratory control sample (LCS) associated with preparation batch 300-16679 and analytical batch 300-17050 was above acceptance criteria. The sample results are well below CRDL indicating no batch contamination. For more information see the attached SIR.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0383
Rev. Number: 0
Date Initiated: 12/31/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-044

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 17

SAMPLE NUMBERS: B3L258, B3L259, B3L261, B3L262, B3L263, B3L265, B3L269, B3L270, B3L271, B3L272, B3L273, B3L274, B3L275, B3L276, B3L277, B3L278, B3L280

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8903-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for PU241 is outside acceptance criteria at 143%. Sample results are a non-detect.

RESOLUTION

PROPOSED RESOLUTION: Please narrate and report results.

FINAL RESOLUTION: See the Proposed Resolution.

SUBMITTED BY:

WORTHY, A 01/02/2019

ACCEPTED BY:

CUTSFORTH, EC 01/02/2019

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L263
Date Collected: 12/04/18 12:40
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0436	U		0.0477	0.370	0.0780	pCi/g	12/15/18 06:00	12/20/18 11:24	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0067	U	0.0420	0.0421	1.00	0.102	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	0.00416	U	0.0424	0.0424	1.00	0.125	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*62.4*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0662**		0.0617	0.0625	1.00	0.0620	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-233/234	0.0838	U	0.0731	0.0743	1.00	0.0857	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-235/236	-0.0022	U	0.0277	0.0277	1.00	0.0599	pCi/g	12/15/18 09:07	12/27/18 08:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*91.0*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:42*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.66	U o	0.144	2.32	15.0	4.51	pCi/g	12/15/18 10:26	12/29/18 15:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*62.4*			*12/15/18 10:26*	*12/29/18 15:08*	*1*

Client Sample ID: B3L275
Date Collected: 12/04/18 12:24
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0031	U		0.0797	0.370	0.0807	pCi/g	12/15/18 06:00	12/20/18 11:24	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0011	U	0.0569	0.0569	1.00	0.104	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	0.0250	U	0.0569	0.0571	1.00	0.118	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Client Sample ID: B3L275
Lab Sample ID: 300-8903-2
Date Collected: 12/04/18 12:24
Matrix: Solid
Date Received: 12/05/18 08:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	57.4		30 - 105	12/15/18 09:06	12/24/18 08:25	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.162		0.0959	0.0994	1.00	0.0661	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-233/234	0.0830		0.0678	0.0691	1.00	0.0508	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-235/236	0.0133	U	0.0277	0.0278	1.00	0.0508	pCi/g	12/15/18 09:07	12/27/18 08:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	76.0		30 - 105	12/15/18 09:07	12/27/18 08:42	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.63	U o	0.151	2.46	15.0	5.06	pCi/g	12/15/18 10:26	12/29/18 17:12	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	57.4			12/15/18 10:26	12/29/18 17:12	1

Client Sample ID: B3L262
Lab Sample ID: 300-8903-3
Date Collected: 12/04/18 13:00
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.15	U		0.141	0.370	0.0680	pCi/g	12/15/18 06:00	12/20/18 12:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00780	U	0.0281	0.0281	1.00	0.0728	pCi/g	12/15/18 09:06	12/24/18 08:23	1
Pu-239/240	-0.0011	U	0.0279	0.0279	1.00	0.0550	pCi/g	12/15/18 09:06	12/24/18 08:23	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	97.6		30 - 105	12/15/18 09:06	12/24/18 08:23	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.131		0.0807	0.0835	1.00	0.0565	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-233/234	0.0959		0.0688	0.0706	1.00	0.0506	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-235/236	-0.0019	U	0.0244	0.0244	1.00	0.0528	pCi/g	12/15/18 09:07	12/27/18 08:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	69.3		30 - 105	12/15/18 09:07	12/27/18 08:42	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.799	U o	0.109	1.41	15.0	2.76	pCi/g	12/15/18 10:26	12/29/18 18:14	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*97.6*			*12/15/18 10:26*	*12/29/18 18:14*	*1*

Client Sample ID: B3L277
Lab Sample ID: 300-8903-4

Date Collected: 12/04/18 11:35
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0188	U		0.0828	0.370	0.0880	pCi/g	12/15/18 06:00	12/20/18 12:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0025	U	0.0311	0.0311	1.00	0.0673	pCi/g	12/15/18 09:06	12/24/18 08:23	1
Pu-239/240	-0.00062	U	0.0310	0.0310	1.00	0.0569	pCi/g	12/15/18 09:06	12/24/18 08:23	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*98.3*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:23*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0974**		0.0835	0.0849	1.00	0.0813	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	**0.185**		0.113	0.117	1.00	0.0709	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.00068	U	0.0341	0.0341	1.00	0.0625	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*74.0*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.811	U o	0.143	1.61	15.0	3.14	pCi/g	12/15/18 10:26	12/29/18 19:16	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*98.3*			*12/15/18 10:26*	*12/29/18 19:16*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L276
Date Collected: 12/04/18 11:05
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.032	U		0.100	0.370	0.0864	pCi/g	12/15/18 06:00	12/20/18 12:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0015	U	0.0253	0.0253	1.00	0.0526	pCi/g	12/15/18 09:06	12/24/18 08:23	1
Pu-239/240	-0.0010	U	0.0253	0.0253	1.00	0.0499	pCi/g	12/15/18 09:06	12/24/18 08:23	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*86.0*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:23*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0552**		0.0460	0.0468	1.00	0.0493	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	**0.108**		0.0627	0.0647	1.00	0.0486	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	0.00660	U	0.0174	0.0175	1.00	0.0403	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*91.8*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.26	U o	0.0813	1.32	15.0	2.72	pCi/g	12/15/18 10:26	12/29/18 20:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.0*			*12/15/18 10:26*	*12/29/18 20:18*	*1*

Client Sample ID: B3L258
Date Collected: 12/04/18 08:47
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0335	U		0.0996	0.370	0.113	pCi/g	12/15/18 06:00	12/20/18 12:23	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0019	U	0.0324	0.0324	1.00	0.0672	pCi/g	12/15/18 09:06	12/24/18 08:24	1
Pu-239/240	0.000	U	0.0323	0.0323	1.00	0.0593	pCi/g	12/15/18 09:06	12/24/18 08:24	1

Client Sample ID: B3L258
Lab Sample ID: 300-8903-6
Date Collected: 12/04/18 08:47
Matrix: Solid
Date Received: 12/05/18 08:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	88.5		30 - 105	12/15/18 09:06	12/24/18 08:24	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.144**		0.0992	0.102	1.00	0.108	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	**0.180**		0.103	0.107	1.00	0.0731	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.0034	U	0.0287	0.0287	1.00	0.0663	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	77.5		30 - 105	12/15/18 09:07	12/27/18 08:43	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.257	U o	0.111	1.68	15.0	3.36	pCi/g	12/15/18 10:26	12/29/18 21:19	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	88.5			12/15/18 10:26	12/29/18 21:19	1

Client Sample ID: B3L269
Lab Sample ID: 300-8903-7
Date Collected: 12/04/18 10:47
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.030	U		0.105	0.370	0.0918	pCi/g	12/15/18 06:00	12/20/18 12:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0048	U	0.0270	0.0271	1.00	0.0673	pCi/g	12/15/18 09:06	12/24/18 08:24	1
Pu-239/240	0.000	U	0.0269	0.0269	1.00	0.0493	pCi/g	12/15/18 09:06	12/24/18 08:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	91.2		30 - 105	12/15/18 09:06	12/24/18 08:24	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0915	U	0.0934	0.0948	1.00	0.0922	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	0.0457	U	0.0660	0.0665	1.00	0.0857	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.00093	U	0.0467	0.0467	1.00	0.0857	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	50.2		30 - 105	12/15/18 09:07	12/27/18 08:43	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.238	U o	0.0947	1.44	15.0	2.90	pCi/g	12/15/18 10:26	12/29/18 22:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.2*			*12/15/18 10:26*	*12/29/18 22:21*	*1*

Client Sample ID: B3L274 — Lab Sample ID: 300-8903-8

Date Collected: 12/04/18 12:07 — **Matrix: Solid**

Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0847	U		0.0626	0.370	0.101	pCi/g	12/15/18 06:00	12/21/18 08:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0065	U	0.0298	0.0298	1.00	0.0771	pCi/g	12/15/18 09:06	12/24/18 08:24	1
Pu-239/240	-0.0012	U	0.0296	0.0296	1.00	0.0583	pCi/g	12/15/18 09:06	12/24/18 08:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*77.7*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:24*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.107**		0.0839	0.0857	1.00	0.0736	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	**0.110**		0.0839	0.0858	1.00	0.0582	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.00063	U	0.0317	0.0317	1.00	0.0582	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*75.3*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.63	U o	0.136	1.53	15.0	3.18	pCi/g	12/15/18 10:26	12/29/18 23:23	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*77.7*			*12/15/18 10:26*	*12/29/18 23:23*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L272
Date Collected: 12/04/18 10:04
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-9
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.109	U		0.0653	0.370	0.118	pCi/g	12/15/18 06:00	12/21/18 08:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0039	U	0.0246	0.0246	1.00	0.0599	pCi/g	12/15/18 09:06	12/24/18 08:24	1
Pu-239/240	-0.0015	U	0.0245	0.0245	1.00	0.0509	pCi/g	12/15/18 09:06	12/24/18 08:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.5*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:24*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0560**		0.0560	0.0567	1.00	0.0514	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	**0.111**		0.0792	0.0811	1.00	0.0514	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.00056	U	0.0280	0.0280	1.00	0.0514	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.8*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.26	U o	0.120	1.34	15.0	2.55	pCi/g	12/15/18 10:26	12/30/18 01:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.5*			*12/15/18 10:26*	*12/30/18 01:27*	*1*

Client Sample ID: B3L273
Date Collected: 12/04/18 09:27
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0783	U		0.0748	0.370	0.112	pCi/g	12/15/18 06:00	12/21/18 08:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00713	U	0.0199	0.0200	1.00	0.0473	pCi/g	12/15/18 09:06	12/24/18 08:24	1
Pu-239/240	-0.00040	U	0.0198	0.0198	1.00	0.0364	pCi/g	12/15/18 09:06	12/24/18 08:24	1

Client Sample ID: B3L273
Lab Sample ID: 300-8903-10
Date Collected: 12/04/18 09:27
Matrix: Solid
Date Received: 12/05/18 08:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	95.2		30 - 105	12/15/18 09:06	12/24/18 08:24	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.278		0.135	0.144	1.00	0.0601	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-233/234	0.211		0.118	0.124	1.00	0.0646	pCi/g	12/15/18 09:07	12/27/18 08:43	1
U-235/236	-0.00065	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/15/18 09:07	12/27/18 08:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	50.1		30 - 105	12/15/18 09:07	12/27/18 08:43	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.102	U o	0.0373	0.989	15.0	1.99	pCi/g	12/15/18 10:26	12/30/18 02:29	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	95.2			12/15/18 10:26	12/30/18 02:29	1

Client Sample ID: B3L261
Lab Sample ID: 300-8903-11
Date Collected: 12/04/18 11:20
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0844	U		0.0618	0.370	0.105	pCi/g	12/15/18 06:00	12/21/18 08:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00584	U	0.0246	0.0246	1.00	0.0660	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.0019	U	0.0244	0.0244	1.00	0.0528	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	85.6		30 - 105	12/15/18 09:06	12/24/18 08:25	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.168		0.102	0.105	1.00	0.0562	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-233/234	0.214		0.115	0.120	1.00	0.0562	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-235/236	0.0147	U	0.0306	0.0307	1.00	0.0562	pCi/g	12/15/18 09:07	12/27/18 08:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	76.3		30 - 105	12/15/18 09:07	12/27/18 08:44	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.26	U o	0.0421	1.29	15.0	2.65	pCi/g	12/15/18 10:26	12/30/18 03:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.6*			*12/15/18 10:26*	*12/30/18 03:31*	*1*

Client Sample ID: B3L265

Lab Sample ID: 300-8903-12

Date Collected: 12/04/18 09:12

Matrix: Solid

Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.035	U		0.108	0.370	0.0918	pCi/g	12/15/18 06:00	12/21/18 08:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0056	U	0.0283	0.0283	1.00	0.0735	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	0.0123	U	0.0281	0.0282	1.00	0.0597	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*102*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0826**		0.0751	0.0764	1.00	0.0663	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-233/234	**0.0833**		0.0751	0.0764	1.00	0.0617	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-235/236	0.0134	U	0.0337	0.0338	1.00	0.0756	pCi/g	12/15/18 09:07	12/27/18 08:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.6*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:44*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.50	U o	0.0956	1.41	15.0	2.90	pCi/g	12/15/18 10:26	12/30/18 04:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*102*			*12/15/18 10:26*	*12/30/18 04:33*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L259
Date Collected: 12/04/18 08:20
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-13
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0453	U		0.0930	0.370	0.108	pCi/g	12/15/18 06:00	12/21/18 09:50	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0050	U	0.0358	0.0358	1.00	0.0851	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.0014	U	0.0357	0.0357	1.00	0.0703	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*80.3*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.111**		0.0746	0.0765	1.00	0.0456	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-233/234	**0.0617**		0.0556	0.0564	1.00	0.0456	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-235/236	-0.00050	U	0.0249	0.0249	1.00	0.0456	pCi/g	12/15/18 09:07	12/27/18 08:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*88.9*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:44*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.76	U o	0.106	1.81	15.0	3.76	pCi/g	12/15/18 10:26	12/30/18 05:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*80.3*			*12/15/18 10:26*	*12/30/18 05:35*	*1*

Client Sample ID: B3L278
Date Collected: 12/04/18 08:00
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-14
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0665	U		0.0670	0.370	0.100	pCi/g	12/15/18 06:00	12/21/18 09:50	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.014	U	0.0327	0.0328	1.00	0.0988	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.0039	U	0.0323	0.0323	1.00	0.0746	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Client Sample ID: B3L278
Lab Sample ID: 300-8903-14
Date Collected: 12/04/18 08:00
Matrix: Solid
Date Received: 12/05/18 08:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	71.1		30 - 105	12/15/18 09:06	12/24/18 08:25	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.117**		0.0830	0.0850	1.00	0.0538	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-233/234	0.0575	U	0.0587	0.0594	1.00	0.0579	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-235/236	-0.00059	U	0.0294	0.0294	1.00	0.0538	pCi/g	12/15/18 09:07	12/27/18 08:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	86.6		30 - 105	12/15/18 09:07	12/27/18 08:44	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.322	U o	0.0788	1.70	15.0	3.39	pCi/g	12/15/18 10:26	12/30/18 06:37	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	71.1			12/15/18 10:26	12/30/18 06:37	1

Client Sample ID: B3L271
Lab Sample ID: 300-8903-15
Date Collected: 12/04/18 09:42
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0385	U		0.0667	0.370	0.0894	pCi/g	12/15/18 06:00	12/21/18 09:51	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0067	U	0.0213	0.0213	1.00	0.0623	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.0017	U	0.0211	0.0211	1.00	0.0476	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	104		30 - 105	12/15/18 09:06	12/24/18 08:25	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0975**		0.0796	0.0813	1.00	0.0597	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-233/234	**0.0644**		0.0650	0.0659	1.00	0.0597	pCi/g	12/15/18 09:07	12/27/18 08:44	1
U-235/236	-0.0013	U	0.0326	0.0326	1.00	0.0642	pCi/g	12/15/18 09:07	12/27/18 08:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	65.4		30 - 105	12/15/18 09:07	12/27/18 08:44	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.16	U o	0.0760	1.13	15.0	2.30	pCi/g	12/15/18 10:26	12/30/18 07:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*104*			*12/15/18 10:26*	*12/30/18 07:39*	*1*

Client Sample ID: B3L260
Lab Sample ID: 300-8903-16

Date Collected: 12/04/18 13:10
Matrix: Solid
Date Received: 12/05/18 08:20

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.058	U		0.115	0.370	0.0772	pCi/g	12/15/18 06:00	12/21/18 09:52	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.012	U	0.0338	0.0339	1.00	0.0974	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.0027	U	0.0334	0.0334	1.00	0.0723	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*87.6*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0631	U	0.0911	0.0919	1.00	0.118	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-233/234	0.0966	U	0.112	0.113	1.00	0.118	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-235/236	0.000	U	0.0644	0.0644	1.00	0.118	pCi/g	12/15/18 09:07	12/27/18 08:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*41.7*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:45*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.222	U o	0.112	1.80	15.0	3.61	pCi/g	12/15/18 10:26	12/30/18 08:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*87.6*			*12/15/18 10:26*	*12/30/18 08:41*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L270
Date Collected: 12/04/18 10:20
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-17
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.041	U		0.106	0.370	0.0827	pCi/g	12/15/18 06:00	12/21/18 09:51	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0024	U	0.0304	0.0304	1.00	0.0673	pCi/g	12/15/18 09:06	12/28/18 10:42	1
Pu-239/240	-0.0036	U	0.0304	0.0304	1.00	0.0720	pCi/g	12/15/18 09:06	12/28/18 10:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*102*		*30 - 105*	*12/15/18 09:06*	*12/28/18 10:42*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.167**		0.100	0.104	1.00	0.0556	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-233/234	**0.151**		0.0958	0.0988	1.00	0.0556	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-235/236	0.000	U	0.0303	0.0303	1.00	0.0556	pCi/g	12/15/18 09:07	12/27/18 08:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.4*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:45*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.028	U o	0.0423	1.39	15.0	2.81	pCi/g	12/15/18 10:26	12/30/18 09:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*106*			*12/15/18 10:26*	*12/30/18 09:43*	*1*

Client Sample ID: B3L280
Date Collected: 12/04/18 10:20
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-18
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.057	U		0.135	0.370	0.106	pCi/g	12/15/18 06:00	12/21/18 10:45	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.012	U	0.0294	0.0294	1.00	0.0867	pCi/g	12/15/18 09:06	12/24/18 08:26	1
Pu-239/240	-0.0023	U	0.0290	0.0290	1.00	0.0627	pCi/g	12/15/18 09:06	12/24/18 08:26	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L280

Date Collected: 12/04/18 10:20
Date Received: 12/05/18 08:20

Lab Sample ID: 300-8903-18

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	88.8		30 - 105	12/15/18 09:06	12/24/18 08:26	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.177**		0.0953	0.0993	1.00	0.0503	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-233/234	**0.204**		0.102	0.107	1.00	0.0467	pCi/g	12/15/18 09:07	12/27/18 08:45	1
U-235/236	0.000	U	0.0255	0.0255	1.00	0.0467	pCi/g	12/15/18 09:07	12/27/18 08:45	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	83.7		30 - 105	12/15/18 09:07	12/27/18 08:45	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.56	U o	0.148	1.55	15.0	3.20	pCi/g	12/15/18 10:26	12/30/18 10:45	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	88.8			12/15/18 10:26	12/30/18 10:45	1

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8903-1	B3L263	62.4
300-8903-1 DU	B3L263	61.9
300-8903-2	B3L275	57.4
300-8903-3	B3L262	97.6
300-8903-4	B3L277	98.3
300-8903-5	B3L276	86.0
300-8903-6	B3L258	88.5
300-8903-7	B3L269	91.2
300-8903-8	B3L274	77.7
300-8903-9	B3L272	95.5
300-8903-10	B3L273	95.2
300-8903-11	B3L261	85.6
300-8903-12	B3L265	102
300-8903-13	B3L259	80.3
300-8903-14	B3L278	71.1
300-8903-15	B3L271	104
300-8903-16	B3L260	87.6
300-8903-17	B3L270	102
300-8903-18	B3L280	88.8
LCS 300-16677/2-A	Lab Control Sample	70.7
MB 300-16677/1-A	Method Blank	70.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8903-1	B3L263	91.0
300-8903-1 DU	B3L263	86.3
300-8903-2	B3L275	76.0
300-8903-3	B3L262	69.3
300-8903-4	B3L277	74.0
300-8903-5	B3L276	91.8
300-8903-6	B3L258	77.5
300-8903-7	B3L269	50.2
300-8903-8	B3L274	75.3
300-8903-9	B3L272	83.8
300-8903-10	B3L273	50.1
300-8903-11	B3L261	76.3
300-8903-12	B3L265	81.6
300-8903-13	B3L259	88.9
300-8903-14	B3L278	86.6
300-8903-15	B3L271	65.4
300-8903-16	B3L260	41.7
300-8903-17	B3L270	80.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**							
300-8903-18	B3L280	83.7							
LCS 300-16678/2-A	Lab Control Sample	77.8							
MB 300-16678/1-A	Method Blank	65.0							

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**							
300-8903-1	B3L263	62.4							
300-8903-1 DU	B3L263	61.9							
300-8903-2	B3L275	57.4							
300-8903-3	B3L262	97.6							
300-8903-4	B3L277	98.3							
300-8903-5	B3L276	86.0							
300-8903-6	B3L258	88.5							
300-8903-7	B3L269	91.2							
300-8903-8	B3L274	77.7							
300-8903-9	B3L272	95.5							
300-8903-10	B3L273	95.2							
300-8903-11	B3L261	85.6							
300-8903-12	B3L265	102							
300-8903-13	B3L259	80.3							
300-8903-14	B3L278	71.1							
300-8903-15	B3L271	104							
300-8903-16	B3L260	87.6							
300-8903-17	B3L270	106							
300-8903-18	B3L280	88.8							
LCS 300-16679/2-A	Lab Control Sample	70.7							
MB 300-16679/1-A	Method Blank	70.6							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16675/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00208	U		0.0650	0.370	0.0581	pCi/g	12/15/18 06:00	12/20/18 11:23	1

Lab Sample ID: LCS 300-16675/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.411		0.189	0.370	0.105	pCi/g	92	80 - 120		

Lab Sample ID: 300-8903-1 DU — **Client Sample ID: B3L263**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	0.0436	U		0.0553	U	0.0672	0.370	0.0965	pCi/g			24	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16678/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17004 — **Prep Batch: 16678**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00429	U	0.0308	0.0308	1.00	0.0732	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-233/234	0.0104	U	0.0308	0.0309	1.00	0.0750	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-235/236	-0.000613	U	0.0307	0.0307	1.00	0.0562	pCi/g	12/15/18 09:07	12/27/18 08:42	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*65.0*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:42*	*1*

Lab Sample ID: LCS 300-16678/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17004 — **Prep Batch: 16678**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.26	2.682		0.586	1.00	0.0735	pCi/g	82	80 - 120		
U-233/234			3.11	2.879		0.619	1.00	0.0697	pCi/g	92	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*77.8*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8903-1 DU — **Client Sample ID: B3L263**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17004 — **Prep Batch: 16678**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0662			0.0895		0.0629	1.00	0.0475	pCi/g			30	30
U-233/234	0.0838	U		0.0482	U y	0.0463	1.00	0.0488	pCi/g			54	30
U-235/236	-0.0022	U		-0.000409	U y	0.0205	1.00	0.0375	pCi/g			137	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*86.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16677/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16937 — **Prep Batch: 16677**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00352	U	0.0441	0.0441	1.00	0.0954	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.00439	U	0.0441	0.0441	1.00	0.0989	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*70.6*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Lab Sample ID: LCS 300-16677/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16937 — **Prep Batch: 16677**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.45	3.759		0.879	1.00	0.107	pCi/g	84	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*70.7*		*30 - 105*

Lab Sample ID: 300-8903-1 DU — **Client Sample ID: B3L263**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16937 — **Prep Batch: 16677**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0067	U		-0.00507	U	0.0425	1.00	0.0981	pCi/g			27	30
Pu-239/240	0.00416	U		-0.00592	U y	0.0425	1.00	0.101	pCi/g			1150	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*61.9*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16679/1-A
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16679

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.596	U	0.186	2.08	15.0	4.00	pCi/g	12/15/18 10:26	12/29/18 13:04	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*70.6*			*12/15/18 10:26*	*12/29/18 13:04*	*1*

Lab Sample ID: LCS 300-16679/2-A
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16679

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			214	305.3	o	20.1	15.0	3.96	pCi/g	143	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*70.7*		

Lab Sample ID: 300-8903-1 DU
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: B3L263
Prep Type: Total/NA
Prep Batch: 16679

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.66	U o		0.128	U y o	2.22	15.0	4.49	pCi/g			171	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*61.9*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

General Chemistry

Analysis Batch: 16676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-1	B3L263	Total/NA	Solid	Moisture	
300-8903-2	B3L275	Total/NA	Solid	Moisture	
300-8903-3	B3L262	Total/NA	Solid	Moisture	
300-8903-4	B3L277	Total/NA	Solid	Moisture	
300-8903-5	B3L276	Total/NA	Solid	Moisture	
300-8903-6	B3L258	Total/NA	Solid	Moisture	
300-8903-7	B3L269	Total/NA	Solid	Moisture	
300-8903-8	B3L274	Total/NA	Solid	Moisture	
300-8903-9	B3L272	Total/NA	Solid	Moisture	
300-8903-10	B3L273	Total/NA	Solid	Moisture	
300-8903-11	B3L261	Total/NA	Solid	Moisture	
300-8903-12	B3L265	Total/NA	Solid	Moisture	
300-8903-13	B3L259	Total/NA	Solid	Moisture	
300-8903-14	B3L278	Total/NA	Solid	Moisture	
300-8903-15	B3L271	Total/NA	Solid	Moisture	
300-8903-16	B3L260	Total/NA	Solid	Moisture	
300-8903-17	B3L270	Total/NA	Solid	Moisture	
300-8903-18	B3L280	Total/NA	Solid	Moisture	
300-8903-1 DU	B3L263	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-1	B3L263	Total/NA	Solid	Direct Addition	
300-8903-2	B3L275	Total/NA	Solid	Direct Addition	
300-8903-3	B3L262	Total/NA	Solid	Direct Addition	
300-8903-4	B3L277	Total/NA	Solid	Direct Addition	
300-8903-5	B3L276	Total/NA	Solid	Direct Addition	
300-8903-6	B3L258	Total/NA	Solid	Direct Addition	
300-8903-7	B3L269	Total/NA	Solid	Direct Addition	
300-8903-8	B3L274	Total/NA	Solid	Direct Addition	
300-8903-9	B3L272	Total/NA	Solid	Direct Addition	
300-8903-10	B3L273	Total/NA	Solid	Direct Addition	
300-8903-11	B3L261	Total/NA	Solid	Direct Addition	
300-8903-12	B3L265	Total/NA	Solid	Direct Addition	
300-8903-13	B3L259	Total/NA	Solid	Direct Addition	
300-8903-14	B3L278	Total/NA	Solid	Direct Addition	
300-8903-15	B3L271	Total/NA	Solid	Direct Addition	
300-8903-16	B3L260	Total/NA	Solid	Direct Addition	
300-8903-17	B3L270	Total/NA	Solid	Direct Addition	
300-8903-18	B3L280	Total/NA	Solid	Direct Addition	
MB 300-16675/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16675/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8903-1 DU	B3L263	Total/NA	Solid	Direct Addition	

Prep Batch: 16677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-1	B3L263	Total/NA	Solid	ExtChrAct	
300-8903-2	B3L275	Total/NA	Solid	ExtChrAct	

Rad (Continued)

Prep Batch: 16677 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-3	B3L262	Total/NA	Solid	ExtChrAct	
300-8903-4	B3L277	Total/NA	Solid	ExtChrAct	
300-8903-5	B3L276	Total/NA	Solid	ExtChrAct	
300-8903-6	B3L258	Total/NA	Solid	ExtChrAct	
300-8903-7	B3L269	Total/NA	Solid	ExtChrAct	
300-8903-8	B3L274	Total/NA	Solid	ExtChrAct	
300-8903-9	B3L272	Total/NA	Solid	ExtChrAct	
300-8903-10	B3L273	Total/NA	Solid	ExtChrAct	
300-8903-11	B3L261	Total/NA	Solid	ExtChrAct	
300-8903-12	B3L265	Total/NA	Solid	ExtChrAct	
300-8903-13	B3L259	Total/NA	Solid	ExtChrAct	
300-8903-14	B3L278	Total/NA	Solid	ExtChrAct	
300-8903-15	B3L271	Total/NA	Solid	ExtChrAct	
300-8903-16	B3L260	Total/NA	Solid	ExtChrAct	
300-8903-17	B3L270	Total/NA	Solid	ExtChrAct	
300-8903-18	B3L280	Total/NA	Solid	ExtChrAct	
MB 300-16677/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16677/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8903-1 DU	B3L263	Total/NA	Solid	ExtChrAct	

Prep Batch: 16678

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-1	B3L263	Total/NA	Solid	ExtChrAct	
300-8903-2	B3L275	Total/NA	Solid	ExtChrAct	
300-8903-3	B3L262	Total/NA	Solid	ExtChrAct	
300-8903-4	B3L277	Total/NA	Solid	ExtChrAct	
300-8903-5	B3L276	Total/NA	Solid	ExtChrAct	
300-8903-6	B3L258	Total/NA	Solid	ExtChrAct	
300-8903-7	B3L269	Total/NA	Solid	ExtChrAct	
300-8903-8	B3L274	Total/NA	Solid	ExtChrAct	
300-8903-9	B3L272	Total/NA	Solid	ExtChrAct	
300-8903-10	B3L273	Total/NA	Solid	ExtChrAct	
300-8903-11	B3L261	Total/NA	Solid	ExtChrAct	
300-8903-12	B3L265	Total/NA	Solid	ExtChrAct	
300-8903-13	B3L259	Total/NA	Solid	ExtChrAct	
300-8903-14	B3L278	Total/NA	Solid	ExtChrAct	
300-8903-15	B3L271	Total/NA	Solid	ExtChrAct	
300-8903-16	B3L260	Total/NA	Solid	ExtChrAct	
300-8903-17	B3L270	Total/NA	Solid	ExtChrAct	
300-8903-18	B3L280	Total/NA	Solid	ExtChrAct	
MB 300-16678/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16678/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8903-1 DU	B3L263	Total/NA	Solid	ExtChrAct	

Prep Batch: 16679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-1	B3L263	Total/NA	Solid	ExtChr_LSC	
300-8903-2	B3L275	Total/NA	Solid	ExtChr_LSC	
300-8903-3	B3L262	Total/NA	Solid	ExtChr_LSC	
300-8903-4	B3L277	Total/NA	Solid	ExtChr_LSC	
300-8903-5	B3L276	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Rad (Continued)

Prep Batch: 16679 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8903-6	B3L258	Total/NA	Solid	ExtChr_LSC	
300-8903-7	B3L269	Total/NA	Solid	ExtChr_LSC	
300-8903-8	B3L274	Total/NA	Solid	ExtChr_LSC	
300-8903-9	B3L272	Total/NA	Solid	ExtChr_LSC	
300-8903-10	B3L273	Total/NA	Solid	ExtChr_LSC	
300-8903-11	B3L261	Total/NA	Solid	ExtChr_LSC	
300-8903-12	B3L265	Total/NA	Solid	ExtChr_LSC	
300-8903-13	B3L259	Total/NA	Solid	ExtChr_LSC	
300-8903-14	B3L278	Total/NA	Solid	ExtChr_LSC	
300-8903-15	B3L271	Total/NA	Solid	ExtChr_LSC	
300-8903-16	B3L260	Total/NA	Solid	ExtChr_LSC	
300-8903-17	B3L270	Total/NA	Solid	ExtChr_LSC	
300-8903-18	B3L280	Total/NA	Solid	ExtChr_LSC	
MB 300-16679/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16679/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8903-1 DU	B3L263	Total/NA	Solid	ExtChr_LSC	

Client Sample ID: B3L263

Lab Sample ID: 300-8903-1

Date Collected: 12/04/18 12:40

Matrix: Solid

Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	367.81 g	367.81 g	16944	12/20/18 11:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	17004	12/27/18 08:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	17050	12/29/18 15:08	DJ	TAL RCH

Client Sample ID: B3L275

Lab Sample ID: 300-8903-2

Date Collected: 12/04/18 12:24

Matrix: Solid

Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	335.47 g	335.47 g	16944	12/20/18 11:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	17004	12/27/18 08:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	17050	12/29/18 17:12	DJ	TAL RCH

Client Sample ID: B3L262

Lab Sample ID: 300-8903-3

Date Collected: 12/04/18 13:00

Matrix: Solid

Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.17 g	358.17 g	16944	12/20/18 12:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16937	12/24/18 08:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.44 g	1.44 g	17004	12/27/18 08:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.12 g	1.12 g	17050	12/29/18 18:14	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L277

Lab Sample ID: 300-8903-4

Date Collected: 12/04/18 11:35
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	361.26 g	361.26 g	16944	12/20/18 12:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.97 g	0.97 g	16937	12/24/18 08:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.91 g	0.91 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.97 g	0.97 g	17050	12/29/18 19:16	DJ	TAL RCH

Client Sample ID: B3L276

Lab Sample ID: 300-8903-5

Date Collected: 12/04/18 11:05
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	343.32 g	343.32 g	16944	12/20/18 12:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.29 g	1.29 g	16937	12/24/18 08:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.51 g	1.51 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.29 g	1.29 g	17050	12/29/18 20:18	DJ	TAL RCH

Client Sample ID: B3L258

Lab Sample ID: 300-8903-6

Date Collected: 12/04/18 08:47
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	353.26 g	353.26 g	16944	12/20/18 12:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16937	12/24/18 08:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.24 g	1.24 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	17050	12/29/18 21:19	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L269

Lab Sample ID: 300-8903-7

Date Collected: 12/04/18 10:47
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	351.99 g	351.99 g	16944	12/20/18 12:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.14 g	1.14 g	16937	12/24/18 08:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.14 g	1.14 g	17050	12/29/18 22:21	DJ	TAL RCH

Client Sample ID: B3L274

Lab Sample ID: 300-8903-8

Date Collected: 12/04/18 12:07
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	380.35 g	380.35 g	16944	12/21/18 08:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.22 g	1.22 g	16937	12/24/18 08:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.22 g	1.22 g	17050	12/29/18 23:23	DJ	TAL RCH

Client Sample ID: B3L272

Lab Sample ID: 300-8903-9

Date Collected: 12/04/18 10:04
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	299.02 g	299.02 g	16944	12/21/18 08:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16937	12/24/18 08:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.23 g	1.23 g	17050	12/30/18 01:27	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L273

Lab Sample ID: 300-8903-10

Date Collected: 12/04/18 09:27
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	319.43 g	319.43 g	16944	12/21/18 08:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.58 g	1.58 g	16937	12/24/18 08:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.58 g	1.58 g	17004	12/27/18 08:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.58 g	1.58 g	17050	12/30/18 02:29	DJ	TAL RCH

Client Sample ID: B3L261

Lab Sample ID: 300-8903-11

Date Collected: 12/04/18 11:20
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	339.69 g	339.69 g	16944	12/21/18 08:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.32 g	1.32 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	17004	12/27/18 08:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.32 g	1.32 g	17050	12/30/18 03:31	DJ	TAL RCH

Client Sample ID: B3L265

Lab Sample ID: 300-8903-12

Date Collected: 12/04/18 09:12
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	366.6 g	366.6 g	16944	12/21/18 08:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	17004	12/27/18 08:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	17050	12/30/18 04:33	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L259

Lab Sample ID: 300-8903-13

Date Collected: 12/04/18 08:20
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	349.24 g	349.24 g	16944	12/21/18 09:50	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	17004	12/27/18 08:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.99 g	0.99 g	17050	12/30/18 05:35	DJ	TAL RCH

Client Sample ID: B3L278

Lab Sample ID: 300-8903-14

Date Collected: 12/04/18 08:00
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	333.22 g	333.22 g	16944	12/21/18 09:50	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.24 g	1.24 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	17004	12/27/18 08:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.24 g	1.24 g	17050	12/30/18 06:37	DJ	TAL RCH

Client Sample ID: B3L271

Lab Sample ID: 300-8903-15

Date Collected: 12/04/18 09:42
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	337.9 g	337.9 g	16944	12/21/18 09:51	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.3 g	1.3 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	17004	12/27/18 08:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.3 g	1.3 g	17050	12/30/18 07:39	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Client Sample ID: B3L260

Lab Sample ID: 300-8903-16
Date Collected: 12/04/18 13:10
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	316.84 g	316.84 g	16944	12/21/18 09:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	16937	12/24/18 08:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	17004	12/27/18 08:45	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.95 g	0.95 g	17050	12/30/18 08:41	DJ	TAL RCH

Client Sample ID: B3L270

Lab Sample ID: 300-8903-17
Date Collected: 12/04/18 10:20
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	354.79 g	354.79 g	16944	12/21/18 09:51	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	17004	12/27/18 08:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16937	12/28/18 10:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	17050	12/30/18 09:43	DJ	TAL RCH

Client Sample ID: B3L280

Lab Sample ID: 300-8903-18
Date Collected: 12/04/18 10:20
Matrix: Solid
Date Received: 12/05/18 08:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16676	12/15/18 06:03	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16675	12/15/18 06:00	TDA	TAL RCH
Total/NA	Analysis	901.1		1	351.34 g	351.34 g	16944	12/21/18 10:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16677	12/15/18 09:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16937	12/24/18 08:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16678	12/15/18 09:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.21 g	1.21 g	17004	12/27/18 08:45	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16679	12/15/18 10:26	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	17050	12/30/18 10:45	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8903-1	B3L263	Solid	12/04/18 12:40	12/05/18 08:20
300-8903-2	B3L275	Solid	12/04/18 12:24	12/05/18 08:20
300-8903-3	B3L262	Solid	12/04/18 13:00	12/05/18 08:20
300-8903-4	B3L277	Solid	12/04/18 11:35	12/05/18 08:20
300-8903-5	B3L276	Solid	12/04/18 11:05	12/05/18 08:20
300-8903-6	B3L258	Solid	12/04/18 08:47	12/05/18 08:20
300-8903-7	B3L269	Solid	12/04/18 10:47	12/05/18 08:20
300-8903-8	B3L274	Solid	12/04/18 12:07	12/05/18 08:20
300-8903-9	B3L272	Solid	12/04/18 10:04	12/05/18 08:20
300-8903-10	B3L273	Solid	12/04/18 09:27	12/05/18 08:20
300-8903-11	B3L261	Solid	12/04/18 11:20	12/05/18 08:20
300-8903-12	B3L265	Solid	12/04/18 09:12	12/05/18 08:20
300-8903-13	B3L259	Solid	12/04/18 08:20	12/05/18 08:20
300-8903-14	B3L278	Solid	12/04/18 08:00	12/05/18 08:20
300-8903-15	B3L271	Solid	12/04/18 09:42	12/05/18 08:20
300-8903-16	B3L260	Solid	12/04/18 13:10	12/05/18 08:20
300-8903-17	B3L270	Solid	12/04/18 10:20	12/05/18 08:20
300-8903-18	B3L280	Solid	12/04/18 10:20	12/05/18 08:20

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-006	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB J-23	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L263	N/A	SOIL	DEC 0 4 2018	1240	✓	✓

8903

i00-8903 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	CHARLETTE Bryfard TARL	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65521 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-018	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-11	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L275	N/A	SOIL	DEC 0 4 2018	1224	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Burgland FARL	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65533 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-005	PAGE 1 OF 1
COLLECTOR: Kevin Patterson /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB J-22	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L262	N/A	SOIL	DEC 0 4 2018	1300	✓	✓

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlotte Berghard CB	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65520 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-020	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-13	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

D247

8903

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L277	N/A	SOIL	DEC 0 4 2018	1135	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlotte Burghard CB TMX	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65535 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

Appendix D

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-019	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-12	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

D248

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L276	N/A	SOIL	DEC 0 4 2018	1105	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Burgland CB TAPE	DEC 0 5 2018 0820

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65534 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-001	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB J-18	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

8903

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L258	N/A	SOIL	DEC 0 4 2018	0847	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1470	SSU-1	DEC 0 4 2018 1470
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Burghard CB TARC	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65516 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-012	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-5	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L269	N/A	SOIL	DEC 04 2018	1045	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 04 2018 1420	SSU-1	DEC 04 2018 1420
SSU-1	DEC 05 2018 0700	Roger Friesz Jr. /CHPRC	DEC 05 2018 0700
Roger Friesz Jr. /CHPRC	DEC 05 2018 0820	Charlotte Burghart	DEC 05 2018 0820

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65527 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-017	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-10	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L274	N/A	SOIL	DEC 0 4 2018	1207	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Bugbard	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65532 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F18-044-015	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	REQUIRED TAT
Kevin Patterson /CHPRC	SUMNER, LC	376-3922	SUMNER, LC	15 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	ORIGINAL
RTL OB-8	RTL Other Buildings - Rad		F18-044	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**PURCHASE ORDER/CHARGE CODE**	**METHOD OF SHIPMENT**
N/A	HNF-N-50736	0"-6"	304708	GOVERNMENT VEHICLE
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**	
TestAmerica Incorporated, Richland	N/A		N/A	

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L272	N/A	SOIL	DEC 0 4 2018	1004	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820		DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65530 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-016	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-9	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L273	N/A	SOIL	DEC 0 4 2018	0927	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Burghard	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65531 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-004	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB J-21	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L261	N/A	SOIL	DEC 04 2018	1120	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 04 2018 1420	SSU-1	DEC 04 2018 1420
SSU-1	DEC 05 2018 0700	Roger Friesz Jr. /CHPRC	DEC 05 2018 0700
Roger Friesz Jr. /CHPRC	DEC 05 2018 0820	Charlotte Bugliad	DEC 05 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65519 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-008	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-1	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L265	N/A	SOIL	DEC 0 4 2018	09 12	✓	✓

8903

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420	TRVL-18-167 (1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700	
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlotte Berghod	DEC 0 5 2018 0820	

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65523 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-002	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB J-19	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

D256

1/4/2019

8903

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L259	N/A	SOIL	DEC 0 4 2018	0820	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Claudette Burglood	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65517 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

Appendix D

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-021	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-14	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L278	N/A	SOIL	DEC 0 4 2018	0800	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 1 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 1 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 1 5 2018 0820	Charlotte [illegible]	DEC 1 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65536 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-014	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-7	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L271	N/A	SOIL	DEC 0 4 2018	0942	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. CHPRC	DEC 0 5 2018 0820	Charlotte Bughead TAEL	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65529 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-003	PAGE 1 OF 1
COLLECTOR: Kevin Patterson /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OB J-20	PROJECT DESIGNATION: RTL Other Buildings - Rad		SAF NO.: F18-044	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

8903

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L260	N/A	SOIL	DEC 0 4 2018	1310	✓	✓

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 4 2018 1470	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlotte Burghart CB TAPL	DEC 0 5 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65518 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-013	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB-6	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

D260

1/4/2019

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L270	N/A	SOIL	DEC 04 2018	1020	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 04 2018 1420	SSU-1	DEC 04 2018 1420
SSU-1	DEC 05 2018 0700	Roger Friesz Jr. /CHPRC	DEC 05 2018 0700
Roger Friesz Jr. /CHPRC	DEC 05 2018 0820	Charlotte Berglund	DEC 05 2018 0820

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65528 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-044-023	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OB DUP2	PROJECT DESIGNATION RTL Other Buildings - Rad		SAF NO. F18-044	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 5 0 7 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8903

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L280	N/A	SOIL	DEC 0 4 2018	1020	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	DEC 0 4 2018 1420	SSU-1	DEC 0 4 2018 1420
SSU-1	DEC 0 5 2018 0700	Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0700
Roger Friesz Jr. /CHPRC	DEC 0 5 2018 0820	Charlette Bryhard	DEC 0 5 2018 0820

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-167
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65538 TRVL NUM = TRVL-18-167 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8903-1
SDG Number: RL8903-1

Login Number: 8903
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8718-1
TestAmerica Sample Delivery Group: RL8718-1
Client Project/Site: F18-046

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
11/30/2018 7:14:43 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Have a Question? Ask The Expert

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8718-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8718-1

Comments
No additional comments.

Receipt
The samples were received on 11/15/2018 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1F3
Date Collected: 11/14/18 09:55
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.026	U		0.0903	0.370	0.0777	pCi/g	11/20/18 12:41	11/28/18 12:14	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0044	U	0.0246	0.0246	1.00	0.0613	pCi/g	11/17/18 07:22	11/28/18 16:18	1
Pu-239/240	-0.0098	U	0.0248	0.0249	1.00	0.0733	pCi/g	11/17/18 07:22	11/28/18 16:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*97.5*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0338	U	0.0927	0.0929	1.00	0.191	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-233/234	0.0732	U	0.0919	0.0929	1.00	0.137	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-235/236	0.0156	U	0.0460	0.0461	1.00	0.112	pCi/g	11/17/18 08:15	11/30/18 08:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*50.9*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:46*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.48	U	0.0911	1.15	15.0	1.79	pCi/g	11/17/18 08:06	11/29/18 20:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*97.5*			*11/17/18 08:06*	*11/29/18 20:19*	*1*

Client Sample ID: B3L1C9
Date Collected: 11/14/18 10:52
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0269	U		0.0659	0.370	0.0812	pCi/g	11/20/18 12:41	11/28/18 13:12	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0079	U	0.0399	0.0399	1.00	0.101	pCi/g	11/17/18 07:22	11/28/18 16:19	1
Pu-239/240	-0.00079	U	0.0396	0.0396	1.00	0.0726	pCi/g	11/17/18 07:22	11/28/18 16:19	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1C9
Date Collected: 11/14/18 10:52
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-2
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	71.8		30 - 105	11/17/18 07:22	11/28/18 16:19	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0942	U	0.108	0.109	1.00	0.156	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-233/234	0.0231	U	0.0481	0.0483	1.00	0.0882	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-235/236	0.0231	U	0.0481	0.0483	1.00	0.0882	pCi/g	11/17/18 08:15	11/30/18 08:46	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	52.3		30 - 105	11/17/18 08:15	11/30/18 08:46	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.81	U	0.118	1.72	15.0	2.70	pCi/g	11/17/18 08:06	11/30/18 00:23	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	71.8			11/17/18 08:06	11/30/18 00:23	1

Client Sample ID: B3L1F7
Date Collected: 11/14/18 10:52
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-3
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.045	U		0.103	0.370	0.0866	pCi/g	11/20/18 12:41	11/28/18 13:13	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0037	U	0.0307	0.0307	1.00	0.0710	pCi/g	11/17/18 07:22	11/28/18 16:19	1
Pu-239/240	-0.00061	U	0.0306	0.0306	1.00	0.0561	pCi/g	11/17/18 07:22	11/28/18 16:19	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	90.0		30 - 105	11/17/18 07:22	11/28/18 16:19	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0439	U	0.0507	0.0512	1.00	0.0537	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-233/234	**0.0866**		0.0717	0.0730	1.00	0.0578	pCi/g	11/17/18 08:15	11/30/18 08:46	1
U-235/236	0.0117	U	0.0294	0.0294	1.00	0.0658	pCi/g	11/17/18 08:15	11/30/18 08:46	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	77.6		30 - 105	11/17/18 08:15	11/30/18 08:46	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1F7
Date Collected: 11/14/18 10:52
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-3
Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.983	U	0.109	1.42	15.0	2.26	pCi/g	11/17/18 08:06	11/30/18 02:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.0*			*11/17/18 08:06*	*11/30/18 02:26*	*1*

Client Sample ID: B3L1D0
Date Collected: 11/14/18 11:41
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0545	U		0.0770	0.370	0.0979	pCi/g	11/20/18 12:41	11/28/18 13:12	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0071	U	0.0298	0.0298	1.00	0.0786	pCi/g	11/17/18 07:22	11/28/18 16:20	1
Pu-239/240	-0.0018	U	0.0296	0.0296	1.00	0.0614	pCi/g	11/17/18 07:22	11/28/18 16:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.4*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0916**		0.0658	0.0673	1.00	0.0484	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	**0.0572**		0.0520	0.0527	1.00	0.0459	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	-0.00047	U	0.0233	0.0233	1.00	0.0427	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*78.3*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:47*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.42	U	0.0907	1.30	15.0	2.02	pCi/g	11/17/18 08:06	11/30/18 04:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.4*			*11/17/18 08:06*	*11/30/18 04:28*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1D8
Date Collected: 11/14/18 11:52
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0597	U		0.0507	0.370	0.0851	pCi/g	11/20/18 12:41	11/28/18 13:13	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0068	U	0.0311	0.0312	1.00	0.0807	pCi/g	11/17/18 07:22	11/28/18 16:20	1
Pu-239/240	-0.00062	U	0.0309	0.0309	1.00	0.0566	pCi/g	11/17/18 07:22	11/28/18 16:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*67.1*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0584	U	0.0950	0.0956	1.00	0.168	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	0.0386	U	0.0669	0.0673	1.00	0.118	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	0.0226	U	0.0472	0.0474	1.00	0.0865	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*57.5*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:47*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.49	U	0.0365	1.51	15.0	2.46	pCi/g	11/17/18 08:06	11/29/18 16:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*67.1*			*11/17/18 08:06*	*11/29/18 16:20*	*1*

Client Sample ID: B3L1F6
Date Collected: 11/14/18 12:10
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00800	U		0.0948	0.370	0.0936	pCi/g	11/20/18 12:41	11/28/18 14:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00980	U	0.0290	0.0290	1.00	0.0706	pCi/g	11/17/18 07:22	11/28/18 16:21	1
Pu-239/240	-0.00058	U	0.0288	0.0288	1.00	0.0529	pCi/g	11/17/18 07:22	11/28/18 16:21	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1F6
Date Collected: 11/14/18 12:10
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-7
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	98.3		30 - 105	11/17/18 07:22	11/28/18 16:21	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0784		0.0725	0.0736	1.00	0.0703	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	0.128		0.0916	0.0940	1.00	0.0640	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	0.0317	U	0.0458	0.0461	1.00	0.0595	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	75.9		30 - 105	11/17/18 08:15	11/30/18 08:47	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.69	U	0.0551	1.44	15.0	2.35	pCi/g	11/17/18 08:06	11/29/18 18:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	98.3			11/17/18 08:06	11/29/18 18:25	1

Client Sample ID: B3L1D1
Date Collected: 11/14/18 10:24
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-9
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0710	U		0.0803	0.370	0.0973	pCi/g	11/20/18 12:41	11/28/18 14:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00449	U	0.0284	0.0284	1.00	0.0809	pCi/g	11/17/18 07:22	11/28/18 16:22	1
Pu-239/240	0.0123	U	0.0281	0.0282	1.00	0.0583	pCi/g	11/17/18 07:22	11/28/18 16:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	94.4		30 - 105	11/17/18 07:22	11/28/18 16:22	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.146		0.0932	0.0961	1.00	0.0582	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	0.116		0.0834	0.0854	1.00	0.0640	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	0.0295	U	0.0417	0.0420	1.00	0.0541	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	79.5		30 - 105	11/17/18 08:15	11/30/18 08:47	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1D1
Date Collected: 11/14/18 10:24
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-9
Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.69	U	0.0808	1.41	15.0	2.31	pCi/g	11/17/18 08:06	11/29/18 20:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.4*			*11/17/18 08:06*	*11/29/18 20:30*	*1*

Client Sample ID: B3L1C5
Date Collected: 11/14/18 13:12
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.060	U		0.100	0.370	0.0749	pCi/g	11/20/18 12:41	11/28/18 14:45	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0085	U	0.0330	0.0331	1.00	0.0886	pCi/g	11/17/18 07:22	11/28/18 16:22	1
Pu-239/240	0.0314	U	0.0463	0.0465	1.00	0.0645	pCi/g	11/17/18 07:22	11/28/18 16:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.0*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:22*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0604**		0.0605	0.0612	1.00	0.0555	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	**0.226**		0.117	0.123	1.00	0.0555	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	0.0139	U	0.0303	0.0304	1.00	0.0597	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.2*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:47*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.350	U	0.0711	1.69	15.0	2.65	pCi/g	11/17/18 08:06	11/29/18 22:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.0*			*11/17/18 08:06*	*11/29/18 22:35*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1D7
Date Collected: 11/14/18 11:28
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-12
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.038	U		0.0849	0.370	0.0694	pCi/g	11/20/18 12:41	11/28/18 14:46	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.000	U	0.0298	0.0298	1.00	0.0929	pCi/g	11/17/18 07:22	11/28/18 16:22	1
Pu-239/240	-0.0018	U	0.0293	0.0293	1.00	0.0608	pCi/g	11/17/18 07:22	11/28/18 16:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*89.5*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:22*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0534**		0.0534	0.0541	1.00	0.0490	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-233/234	**0.105**		0.0756	0.0775	1.00	0.0556	pCi/g	11/17/18 08:15	11/30/18 08:47	1
U-235/236	0.000	U	0.0267	0.0267	1.00	0.0490	pCi/g	11/17/18 08:15	11/30/18 08:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*74.4*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:47*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.14	U	0.0838	1.53	15.0	2.46	pCi/g	11/17/18 08:06	11/30/18 00:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*89.5*			*11/17/18 08:06*	*11/30/18 00:41*	*1*

Client Sample ID: B3L1C6
Date Collected: 11/14/18 13:25
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-14
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00840	U		0.0897	0.370	0.0936	pCi/g	11/20/18 12:41	11/28/18 14:45	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0089	U	0.0320	0.0320	1.00	0.0872	pCi/g	11/17/18 07:22	11/28/18 16:23	1
Pu-239/240	-0.0070	U	0.0319	0.0319	1.00	0.0827	pCi/g	11/17/18 07:22	11/28/18 16:23	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1C6
Date Collected: 11/14/18 13:25
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-14
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	93.3		30 - 105	11/17/18 07:22	11/28/18 16:23	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.114**		0.0807	0.0827	1.00	0.0524	pCi/g	11/17/18 08:15	11/30/18 08:48	1
U-233/234	**0.168**		0.0989	0.102	1.00	0.0663	pCi/g	11/17/18 08:15	11/30/18 08:48	1
U-235/236	0.0143	U	0.0286	0.0286	1.00	0.0524	pCi/g	11/17/18 08:15	11/30/18 08:48	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	91.6		30 - 105	11/17/18 08:15	11/30/18 08:48	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.16	U	0.0501	1.51	15.0	2.42	pCi/g	11/17/18 08:06	11/30/18 02:46	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	93.3			11/17/18 08:06	11/30/18 02:46	1

Client Sample ID: B3L1D5
Date Collected: 11/14/18 13:39
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-16
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0017	U		0.103	0.370	0.0958	pCi/g	11/20/18 12:41	11/28/18 15:43	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0085	U	0.0252	0.0253	1.00	0.0718	pCi/g	11/17/18 07:22	11/28/18 16:24	1
Pu-239/240	-0.0015	U	0.0250	0.0250	1.00	0.0518	pCi/g	11/17/18 07:22	11/28/18 16:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	92.6		30 - 105	11/17/18 07:22	11/28/18 16:24	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0925**		0.0771	0.0785	1.00	0.0655	pCi/g	11/17/18 08:15	11/30/18 08:48	1
U-233/234	**0.110**		0.0833	0.0851	1.00	0.0578	pCi/g	11/17/18 08:15	11/30/18 08:48	1
U-235/236	0.0151	U	0.0315	0.0316	1.00	0.0578	pCi/g	11/17/18 08:15	11/30/18 08:48	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	74.9		30 - 105	11/17/18 08:15	11/30/18 08:48	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1D5

Date Collected: 11/14/18 13:39
Date Received: 11/15/18 09:20

Lab Sample ID: 300-8718-16

Matrix: Solid

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.468	U	0.0328	1.36	15.0	2.14	pCi/g	11/17/18 08:06	11/30/18 04:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*92.6*			*11/17/18 08:06*	*11/30/18 04:51*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8718-1	B3L1F3	97.5
300-8718-1 DU	B3L1F3	99.9
300-8718-2	B3L1C9	71.8
300-8718-3	B3L1F7	90.0
300-8718-5	B3L1D0	95.4
300-8718-6	B3L1D8	67.1
300-8718-7	B3L1F6	98.3
300-8718-9	B3L1D1	94.4
300-8718-10	B3L1C5	88.0
300-8718-12	B3L1D7	89.5
300-8718-14	B3L1C6	93.3
300-8718-16	B3L1D5	92.6
LCS 300-16199/1-A	Lab Control Sample	97.0
MB 300-15927/1-A	Method Blank	105

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8718-1	B3L1F3	50.9
300-8718-1 DU	B3L1F3	81.1
300-8718-2	B3L1C9	52.3
300-8718-3	B3L1F7	77.6
300-8718-5	B3L1D0	78.3
300-8718-6	B3L1D8	57.5
300-8718-7	B3L1F6	75.9
300-8718-9	B3L1D1	79.5
300-8718-10	B3L1C5	80.2
300-8718-12	B3L1D7	74.4
300-8718-14	B3L1C6	91.6
300-8718-16	B3L1D5	74.9
LCS 300-15933/2-A	Lab Control Sample	74.3
MB 300-15933/1-A	Method Blank	58.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8718-1	B3L1F3	97.5
300-8718-1 DU	B3L1F3	99.9

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8718-2	B3L1C9	71.8							
300-8718-3	B3L1F7	90.0							
300-8718-5	B3L1D0	95.4							
300-8718-6	B3L1D8	67.1							
300-8718-7	B3L1F6	98.3							
300-8718-9	B3L1D1	94.4							
300-8718-10	B3L1C5	88.0							
300-8718-12	B3L1D7	89.5							
300-8718-14	B3L1C6	93.3							
300-8718-16	B3L1D5	92.6							
LCS 300-15932/2-A	Lab Control Sample	111							
MB 300-15932/1-A	Method Blank	105							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15968/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0107	U		0.0710	0.370	0.0604	pCi/g	11/20/18 12:41	11/28/18 12:13	1

Lab Sample ID: LCS 300-15968/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.64	2.689		0.203	0.370	0.0914	pCi/g	102	80 - 120

Lab Sample ID: 300-8718-1 DU — **Client Sample ID: B3L1F3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.026	U	-0.0687	U y	0.110	0.370	0.0698	pCi/g	89	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15933/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16261 — **Prep Batch: 15933**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0108	U	0.0420	0.0421	1.00	0.111	pCi/g	11/17/18 08:15	11/30/18 08:45	1
U-233/234	0.0167	U	0.0418	0.0419	1.00	0.0937	pCi/g	11/17/18 08:15	11/30/18 08:45	1
U-235/236	-0.00167	U	0.0417	0.0417	1.00	0.0822	pCi/g	11/17/18 08:15	11/30/18 08:45	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*58.7*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:45*	*1*

Lab Sample ID: LCS 300-15933/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16261 — **Prep Batch: 15933**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	1.78	1.872		0.462	1.00	0.0773	pCi/g	105	80 - 120
U-233/234	1.70	1.403		0.378	1.00	0.0773	pCi/g	82	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*74.3*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8718-1 DU — **Client Sample ID: B3L1F3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16261 — **Prep Batch: 15933**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0338	U		0.168	y	0.103	1.00	0.0703	pCi/g			133	30
U-233/234	0.0732	U		0.0838		0.0716	1.00	0.0623	pCi/g			14	30
U-235/236	0.0156	U		-0.000575	U y	0.0287	1.00	0.0527	pCi/g			215	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*81.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15927/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16197 — **Prep Batch: 15927**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00246	U	0.0309	0.0309	1.00	0.0700	pCi/g	11/17/18 07:22	11/28/18 16:17	1
Pu-239/240	-0.00493	U	0.0310	0.0310	1.00	0.0789	pCi/g	11/17/18 07:22	11/28/18 16:17	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*105*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:17*	*1*

Lab Sample ID: 300-8718-1 DU — **Client Sample ID: B3L1F3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16197 — **Prep Batch: 15927**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0044	U		-0.00218	U y	0.0273	1.00	0.0591	pCi/g			68	30
Pu-239/240	-0.0098	U		-0.00327	U y	0.0273	1.00	0.0631	pCi/g			100	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*99.9*		*30 - 105*

Lab Sample ID: LCS 300-16199/1-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16208 — **Prep Batch: 16199**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.849	0.844		0.252	1.00	0.0803	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.0*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15932/1-A
Matrix: Solid
Analysis Batch: 16241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15932

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.572	U	0.0738	1.24	15.0	2.01	pCi/g	11/17/18 08:06	11/29/18 16:14	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*11/17/18 08:06*	*11/29/18 16:14*	*1*

Lab Sample ID: LCS 300-15932/2-A
Matrix: Solid
Analysis Batch: 16241

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15932

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			211	231.9		14.7	15.0	1.92	pCi/g	110	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*111*		

Lab Sample ID: 300-8718-1 DU
Matrix: Solid
Analysis Batch: 16241

Client Sample ID: B3L1F3
Prep Type: Total/NA
Prep Batch: 15932

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.48	U		1.143	U	1.24	15.0	1.96	pCi/g			26	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*99.9*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

General Chemistry

Analysis Batch: 15934

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-1	B3L1F3	Total/NA	Solid	Moisture	
300-8718-2	B3L1C9	Total/NA	Solid	Moisture	
300-8718-3	B3L1F7	Total/NA	Solid	Moisture	
300-8718-5	B3L1D0	Total/NA	Solid	Moisture	
300-8718-6	B3L1D8	Total/NA	Solid	Moisture	
300-8718-7	B3L1F6	Total/NA	Solid	Moisture	
300-8718-9	B3L1D1	Total/NA	Solid	Moisture	
300-8718-10	B3L1C5	Total/NA	Solid	Moisture	
300-8718-12	B3L1D7	Total/NA	Solid	Moisture	
300-8718-14	B3L1C6	Total/NA	Solid	Moisture	
300-8718-16	B3L1D5	Total/NA	Solid	Moisture	

Rad

Prep Batch: 15927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-1	B3L1F3	Total/NA	Solid	ExtChrAct	
300-8718-2	B3L1C9	Total/NA	Solid	ExtChrAct	
300-8718-3	B3L1F7	Total/NA	Solid	ExtChrAct	
300-8718-5	B3L1D0	Total/NA	Solid	ExtChrAct	
300-8718-6	B3L1D8	Total/NA	Solid	ExtChrAct	
300-8718-7	B3L1F6	Total/NA	Solid	ExtChrAct	
300-8718-9	B3L1D1	Total/NA	Solid	ExtChrAct	
300-8718-10	B3L1C5	Total/NA	Solid	ExtChrAct	
300-8718-12	B3L1D7	Total/NA	Solid	ExtChrAct	
300-8718-14	B3L1C6	Total/NA	Solid	ExtChrAct	
300-8718-16	B3L1D5	Total/NA	Solid	ExtChrAct	
MB 300-15927/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
300-8718-1 DU	B3L1F3	Total/NA	Solid	ExtChrAct	

Prep Batch: 15932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-1	B3L1F3	Total/NA	Solid	ExtChr_LSC	
300-8718-2	B3L1C9	Total/NA	Solid	ExtChr_LSC	
300-8718-3	B3L1F7	Total/NA	Solid	ExtChr_LSC	
300-8718-5	B3L1D0	Total/NA	Solid	ExtChr_LSC	
300-8718-6	B3L1D8	Total/NA	Solid	ExtChr_LSC	
300-8718-7	B3L1F6	Total/NA	Solid	ExtChr_LSC	
300-8718-9	B3L1D1	Total/NA	Solid	ExtChr_LSC	
300-8718-10	B3L1C5	Total/NA	Solid	ExtChr_LSC	
300-8718-12	B3L1D7	Total/NA	Solid	ExtChr_LSC	
300-8718-14	B3L1C6	Total/NA	Solid	ExtChr_LSC	
300-8718-16	B3L1D5	Total/NA	Solid	ExtChr_LSC	
MB 300-15932/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-15932/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8718-1 DU	B3L1F3	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 15933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-1	B3L1F3	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Rad (Continued)

Prep Batch: 15933 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-2	B3L1C9	Total/NA	Solid	ExtChrAct	
300-8718-3	B3L1F7	Total/NA	Solid	ExtChrAct	
300-8718-5	B3L1D0	Total/NA	Solid	ExtChrAct	
300-8718-6	B3L1D8	Total/NA	Solid	ExtChrAct	
300-8718-7	B3L1F6	Total/NA	Solid	ExtChrAct	
300-8718-9	B3L1D1	Total/NA	Solid	ExtChrAct	
300-8718-10	B3L1C5	Total/NA	Solid	ExtChrAct	
300-8718-12	B3L1D7	Total/NA	Solid	ExtChrAct	
300-8718-14	B3L1C6	Total/NA	Solid	ExtChrAct	
300-8718-16	B3L1D5	Total/NA	Solid	ExtChrAct	
MB 300-15933/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-15933/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8718-1 DU	B3L1F3	Total/NA	Solid	ExtChrAct	

Prep Batch: 15968

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8718-1	B3L1F3	Total/NA	Solid	Direct Addition	
300-8718-2	B3L1C9	Total/NA	Solid	Direct Addition	
300-8718-3	B3L1F7	Total/NA	Solid	Direct Addition	
300-8718-5	B3L1D0	Total/NA	Solid	Direct Addition	
300-8718-6	B3L1D8	Total/NA	Solid	Direct Addition	
300-8718-7	B3L1F6	Total/NA	Solid	Direct Addition	
300-8718-9	B3L1D1	Total/NA	Solid	Direct Addition	
300-8718-10	B3L1C5	Total/NA	Solid	Direct Addition	
300-8718-12	B3L1D7	Total/NA	Solid	Direct Addition	
300-8718-14	B3L1C6	Total/NA	Solid	Direct Addition	
300-8718-16	B3L1D5	Total/NA	Solid	Direct Addition	
MB 300-15968/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-15968/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8718-1 DU	B3L1F3	Total/NA	Solid	Direct Addition	

Prep Batch: 16199

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 300-16199/1-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1F3

Lab Sample ID: 300-8718-1
Date Collected: 11/14/18 09:55
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	402.94 g	402.94 g	16217	11/28/18 12:14	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16197	11/28/18 16:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16261	11/30/18 08:46	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.17 g	1.17 g	16241	11/29/18 20:19	DJ	TAL RCH

Client Sample ID: B3L1C9

Lab Sample ID: 300-8718-2
Date Collected: 11/14/18 10:52
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	355.51 g	355.51 g	16217	11/28/18 13:12	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16197	11/28/18 16:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16261	11/30/18 08:46	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.05 g	1.05 g	16241	11/30/18 00:23	DJ	TAL RCH

Client Sample ID: B3L1F7

Lab Sample ID: 300-8718-3
Date Collected: 11/14/18 10:52
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	383.62 g	383.62 g	16217	11/28/18 13:13	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16197	11/28/18 16:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16261	11/30/18 08:46	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1 g	1 g	16241	11/30/18 02:26	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1D0

Lab Sample ID: 300-8718-5

Date Collected: 11/14/18 11:41
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	385.68 g	385.68 g	16217	11/28/18 13:12	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16197	11/28/18 16:20	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.05 g	1.05 g	16241	11/30/18 04:28	DJ	TAL RCH

Client Sample ID: B3L1D8

Lab Sample ID: 300-8718-6

Date Collected: 11/14/18 11:52
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	385.64 g	385.64 g	16217	11/28/18 13:13	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.41 g	1.41 g	16197	11/28/18 16:20	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.41 g	1.41 g	16240	11/29/18 16:20	DJ	TAL RCH

Client Sample ID: B3L1F6

Lab Sample ID: 300-8718-7

Date Collected: 11/14/18 12:10
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	395.22 g	395.22 g	16217	11/28/18 14:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16197	11/28/18 16:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1 g	1 g	16240	11/29/18 18:25	DJ	TAL RCH

Client Sample ID: B3L1D1

Lab Sample ID: 300-8718-9

Date Collected: 11/14/18 10:24

Matrix: Solid

Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	375.31 g	375.31 g	16217	11/28/18 14:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16197	11/28/18 16:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	16240	11/29/18 20:30	DJ	TAL RCH

Client Sample ID: B3L1C5

Lab Sample ID: 300-8718-10

Date Collected: 11/14/18 13:12

Matrix: Solid

Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	364.26 g	364.26 g	16217	11/28/18 14:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	16197	11/28/18 16:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.99 g	0.99 g	16240	11/29/18 22:35	DJ	TAL RCH

Client Sample ID: B3L1D7

Lab Sample ID: 300-8718-12

Date Collected: 11/14/18 11:28

Matrix: Solid

Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	399.89 g	399.89 g	16217	11/28/18 14:46	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16197	11/28/18 16:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	16261	11/30/18 08:47	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16240	11/30/18 00:41	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Client Sample ID: B3L1C6

Lab Sample ID: 300-8718-14

Date Collected: 11/14/18 13:25
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.19 g	358.19 g	16217	11/28/18 14:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16197	11/28/18 16:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16261	11/30/18 08:48	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	16240	11/30/18 02:46	DJ	TAL RCH

Client Sample ID: B3L1D5

Lab Sample ID: 300-8718-16

Date Collected: 11/14/18 13:39
Matrix: Solid
Date Received: 11/15/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15934	11/17/18 11:17	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15968	11/20/18 12:41	TDA	TAL RCH
Total/NA	Analysis	901.1		1	362.77 g	362.77 g	16217	11/28/18 15:43	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15927	11/17/18 07:22	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	16197	11/28/18 16:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					15933	11/17/18 08:15	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16261	11/30/18 08:48	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					15932	11/17/18 08:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.18 g	1.18 g	16240	11/30/18 04:51	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8718-1	B3L1F3	Solid	11/14/18 09:55	11/15/18 09:20
300-8718-2	B3L1C9	Solid	11/14/18 10:52	11/15/18 09:20
300-8718-3	B3L1F7	Solid	11/14/18 10:52	11/15/18 09:20
300-8718-5	B3L1D0	Solid	11/14/18 11:41	11/15/18 09:20
300-8718-6	B3L1D8	Solid	11/14/18 11:52	11/15/18 09:20
300-8718-7	B3L1F6	Solid	11/14/18 12:10	11/15/18 09:20
300-8718-9	B3L1D1	Solid	11/14/18 10:24	11/15/18 09:20
300-8718-10	B3L1C5	Solid	11/14/18 13:12	11/15/18 09:20
300-8718-12	B3L1D7	Solid	11/14/18 11:28	11/15/18 09:20
300-8718-14	B3L1C6	Solid	11/14/18 13:25	11/15/18 09:20
300-8718-16	B3L1D5	Solid	11/14/18 13:39	11/15/18 09:20

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-021	PAGE 1 OF 1
COLLECTOR: Kevin Patterson, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL J-31	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: ~~HNF-N-~~ 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F3	N/A	SOIL	NOV 14 2018	0955	✓	✓

300-8718 COC

RL8718-1
8718

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0500	Lesly Wall /CHPRC	NOV 15 2018 0500
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65490 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-007	PAGE 1 OF 1
COLLECTOR: Kevin Patterson, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL-7	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: ~~HNF-N-~~ 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33L1C9	N/A	SOIL	NOV 14 2018	1052	✓	✓

RL 8718-1
8718

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0500	Lesly Wall /CHPRC	NOV 15 2018 0500
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65476 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-025	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL DUP1	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
83L1F7	N/A	SOIL	NOV 14 2018	1052	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65494 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-008	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL-8	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D0	N/A	SOIL	NOV 14 2018	1141	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1530	SSU-1	NOV 14 2018 1530
SSU-1	NOV 15 2018 0800	Leely Wall /CHPRC	NOV 15 2018 0800
Leely Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65477 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-016	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	ORIGINAL	REQUIRED TAT 15 Days
SAMPLING LOCATION RTL PL J-26	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046		
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D8	N/A	SOIL	NOV 14 2018	1152	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0500	Lesly Wall /CHPRC	NOV 15 2018 0500
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65485 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-024	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL J-44	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** ~~HNF-N-~~ 507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F6	N/A	SOIL	NOV 14 2018	1210	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65493 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-009	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL-9	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D1	N/A	SOIL	NOV 14 2018	1024	✓	✓

RL 8718-1
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65478 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-003	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL-3	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C5	N/A	SOIL	NOV 14 2013	1312	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2013 1300	SSU-1	NOV 14 2013 1300
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65472 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-015	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL J-25	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D7	N/A	SOIL	NOV 14 2018	1128	✓	✓

RL8718-1
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1510	SSU-1	NOV 14 2018
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65484 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-004	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL-4	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-5067 36 11.14.18	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C6	N/A	SOIL	NOV 14 2018	1325	✓	✓

RLB718-1
8718

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1 Lesly Wall /CHPRC	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65473 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-013	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PL-13	**PROJECT DESIGNATION** RTL Pipelines - Rad		**SAF NO.** F18-046	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None		
HOLDING TIME	6 Months	6 Months		
TYPE OF CONTAINER	G/P	G/P		
NO. OF CONTAINER(S)	1	1		
VOLUME	1L	60mL		
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS		

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D5	N/A	SOIL	NOV 14 2018	1339	✓	✓

RL87187
8718

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 14 2018 1500	SSU-1	NOV 14 2018 1500
SSU-1	NOV 15 2018 0800	Lesly Wall /CHPRC	NOV 15 2018 0800
Lesly Wall /CHPRC	NOV 15 2018 0920	T. Holm TARL	NOV 15 2018 0920

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65482 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8718-1
SDG Number: RL8718-1

Login Number: 8718
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8734-1
TestAmerica Sample Delivery Group: RL8734-1
Client Project/Site: F18-046

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/20/2018 9:09:51 AM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Have a Question? Ask The Expert

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8734-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8734-1

Comments
No additional comments.

Receipt
The samples were received on 11/16/2018 8:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD

The LCS recovery for U-238 was outside acceptance criteria. For more information see the attached SIR.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0331
Rev. Number: 0
Date Initiated: 12/20/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-046

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 14

SAMPLE NUMBERS: B3L1C3, B3L1C4, B3L1C7, B3L1C8, B3L1D2, B3L1D3, B3L1D4, B3L1D6, B3L1D9, B3L1F0, B3L1F1, B3L1F2, B3L1F5, B3L1F8

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8734-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for U-238 is 78%, but within QSM limits.
Sample results are a non-detect: B3L1F8, B3L1C4,
Sample results above the MDA: B3L1D2, B3L1D3, B3L1C7, B3L1D6, B3L1F0, B3L1F5, B3L1C8, B3L1F1, B3L1F2, B3L1C3, B3L1D9, B3L1D4.

RESOLUTION

PROPOSED RESOLUTION: Please narrate and report.

FINAL RESOLUTION: See Proposed Resolution.

SUBMITTED BY:

WORTHY, A 12/20/2018

ACCEPTED BY:

CUTSFORTH, EC 12/20/2018

Client Sample ID: B3L1F8

Lab Sample ID: 300-8734-1

Date Collected: 11/15/18 09:22
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.032	U		0.0952	0.370	0.0826	pCi/g	11/27/18 09:32	11/27/18 15:49	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00723	U	0.0332	0.0332	1.00	0.0905	pCi/g	11/27/18 11:50	12/04/18 17:26	1
Pu-239/240	-0.0072	U	0.0331	0.0331	1.00	0.0858	pCi/g	11/27/18 11:50	12/04/18 17:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*89.9*		*30 - 105*	*11/27/18 11:50*	*12/04/18 17:26*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0541	U o	0.0778	0.0782	1.00	0.132	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-233/234	**0.218**		0.117	0.122	1.00	0.0926	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-235/236	-0.0064	U	0.0294	0.0294	1.00	0.0761	pCi/g	11/27/18 15:07	12/04/18 14:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*89.6*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:24*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.87	U	0.128	1.51	15.0	2.42	pCi/g	11/27/18 14:56	12/11/18 21:15	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*89.9*			*11/27/18 14:56*	*12/11/18 21:15*	*1*

Client Sample ID: B3L1D2

Lab Sample ID: 300-8734-2

Date Collected: 11/15/18 09:22
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0073	U		0.0941	0.370	0.0793	pCi/g	11/27/18 09:32	11/27/18 15:49	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00654	U	0.0301	0.0301	1.00	0.0819	pCi/g	11/27/18 11:50	12/04/18 17:26	1
Pu-239/240	-0.00059	U	0.0297	0.0297	1.00	0.0545	pCi/g	11/27/18 11:50	12/04/18 17:26	1

Client Sample ID: B3L1D2

Lab Sample ID: 300-8734-2

Date Collected: 11/15/18 09:22
Matrix: Solid
Date Received: 11/16/18 08:35

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	94.9		30 - 105	11/27/18 11:50	12/04/18 17:26	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.118	o	0.0694	0.0716	1.00	0.0623	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	0.109		0.0641	0.0662	1.00	0.0416	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	-0.00037	U	0.0185	0.0185	1.00	0.0340	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	96.4		30 - 105	11/27/18 15:07	12/04/18 14:25	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.455	U	0.0593	1.45	15.0	2.44	pCi/g	11/27/18 14:56	12/12/18 01:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	94.9			11/27/18 14:56	12/12/18 01:26	1

Client Sample ID: B3L1D3

Lab Sample ID: 300-8734-3

Date Collected: 11/15/18 11:32
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00386	U		0.126	0.370	0.118	pCi/g	11/27/18 09:32	11/27/18 16:43	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00096	U	0.0239	0.0239	1.00	0.0472	pCi/g	11/27/18 11:50	12/04/18 17:27	1
Pu-239/240	-0.00096	U	0.0239	0.0239	1.00	0.0472	pCi/g	11/27/18 11:50	12/04/18 17:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	88.1		30 - 105	11/27/18 11:50	12/04/18 17:27	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.134	o	0.0870	0.0894	1.00	0.0656	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	0.108		0.0778	0.0796	1.00	0.0572	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	-0.0028	U	0.0276	0.0276	1.00	0.0619	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	86.7		30 - 105	11/27/18 15:07	12/04/18 14:25	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1D3

Lab Sample ID: 300-8734-3
Date Collected: 11/15/18 11:32
Matrix: Solid
Date Received: 11/16/18 08:35

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.87	U	0.0595	1.06	15.0	1.89	pCi/g	11/27/18 14:56	12/12/18 03:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.1*			*11/27/18 14:56*	*12/12/18 03:31*	*1*

Client Sample ID: B3L1C7

Lab Sample ID: 300-8734-4
Date Collected: 11/15/18 11:03
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.014	U		0.105	0.370	0.0931	pCi/g	11/27/18 09:32	11/27/18 16:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00601	U	0.0276	0.0276	1.00	0.0753	pCi/g	11/27/18 11:50	12/05/18 08:49	1
Pu-239/240	-0.0011	U	0.0274	0.0274	1.00	0.0539	pCi/g	11/27/18 11:50	12/05/18 08:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*87.9*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.217**	**o**	0.101	0.106	1.00	0.0554	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	**0.219**		0.101	0.106	1.00	0.0483	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	**0.0459**		0.0464	0.0469	1.00	0.0426	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*85.3*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:25*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.35	U	0.0652	1.30	15.0	2.27	pCi/g	11/27/18 14:56	12/12/18 05:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*87.9*			*11/27/18 14:56*	*12/12/18 05:37*	*1*

Client Sample ID: B3L1C4

Lab Sample ID: 300-8734-5

Date Collected: 11/15/18 10:47

Matrix: Solid

Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0366	U		0.0733	0.370	0.0888	pCi/g	11/27/18 09:32	11/27/18 16:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0091	U	0.0309	0.0309	1.00	0.0854	pCi/g	11/27/18 11:50	12/05/18 08:50	1
Pu-239/240	0.0140	U	0.0305	0.0306	1.00	0.0602	pCi/g	11/27/18 11:50	12/05/18 08:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.4*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0517	U o	0.0690	0.0695	1.00	0.114	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	**0.109**		0.0777	0.0795	1.00	0.0713	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	-0.0041	U	0.0260	0.0260	1.00	0.0633	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*99.0*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:25*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.58	U	0.0452	1.18	15.0	2.11	pCi/g	11/27/18 14:56	12/12/18 07:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.4*			*11/27/18 14:56*	*12/12/18 07:42*	*1*

Client Sample ID: B3L1D6

Lab Sample ID: 300-8734-6

Date Collected: 11/15/18 12:11

Matrix: Solid

Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0127	U		0.0596	0.370	0.0678	pCi/g	11/27/18 09:32	11/27/18 16:45	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0091	U	0.0202	0.0203	1.00	0.0617	pCi/g	11/27/18 11:50	12/05/18 08:50	1
Pu-239/240	-0.0012	U	0.0199	0.0199	1.00	0.0413	pCi/g	11/27/18 11:50	12/05/18 08:50	1

Client Sample ID: B3L1D6

Lab Sample ID: 300-8734-6

Date Collected: 11/15/18 12:11
Matrix: Solid
Date Received: 11/16/18 08:35

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	85.7		30 - 105	11/27/18 11:50	12/05/18 08:50	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0640	o	0.0592	0.0600	1.00	0.0575	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	0.118		0.0794	0.0814	1.00	0.0523	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	-0.00053	U	0.0265	0.0265	1.00	0.0486	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	92.8		30 - 105	11/27/18 15:07	12/04/18 14:25	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.041	U	0.0223	0.930	15.0	1.62	pCi/g	11/27/18 14:56	12/12/18 09:47	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	85.7			11/27/18 14:56	12/12/18 09:47	1

Client Sample ID: B3L1F0

Lab Sample ID: 300-8734-7

Date Collected: 11/15/18 09:52
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00519	U		0.0852	0.370	0.0870	pCi/g	11/27/18 09:32	11/27/18 16:44	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0062	U	0.0260	0.0260	1.00	0.0684	pCi/g	11/27/18 11:50	12/05/18 08:50	1
Pu-239/240	-0.0041	U	0.0259	0.0259	1.00	0.0629	pCi/g	11/27/18 11:50	12/05/18 08:50	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	99.5		30 - 105	11/27/18 11:50	12/05/18 08:50	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0951	o	0.0634	0.0651	1.00	0.0388	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-233/234	0.104		0.0668	0.0688	1.00	0.0459	pCi/g	11/27/18 15:07	12/04/18 14:25	1
U-235/236	-0.00084	U	0.0212	0.0212	1.00	0.0417	pCi/g	11/27/18 15:07	12/04/18 14:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	84.2		30 - 105	11/27/18 15:07	12/04/18 14:25	1

Client Sample ID: B3L1F0

Lab Sample ID: 300-8734-7
Date Collected: 11/15/18 09:52
Matrix: Solid
Date Received: 11/16/18 08:35

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.63	U	0.0468	1.06	15.0	1.89	pCi/g	11/27/18 14:56	12/12/18 11:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.5*			*11/27/18 14:56*	*12/12/18 11:53*	*1*

Client Sample ID: B3L1F5

Lab Sample ID: 300-8734-8
Date Collected: 11/15/18 09:03
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0222	U		0.0770	0.370	0.0868	pCi/g	11/27/18 09:32	11/27/18 17:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00834	U	0.0301	0.0301	1.00	0.0778	pCi/g	11/27/18 11:50	12/05/18 08:50	1
Pu-239/240	-0.0018	U	0.0298	0.0299	1.00	0.0620	pCi/g	11/27/18 11:50	12/05/18 08:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*74.3*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.144**	**o**	0.0873	0.0901	1.00	0.0483	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	**0.0779**		0.0645	0.0656	1.00	0.0519	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	-0.0011	U	0.0264	0.0264	1.00	0.0519	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*87.2*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.41	U	0.129	1.42	15.0	2.46	pCi/g	11/27/18 14:56	12/12/18 13:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*74.3*			*11/27/18 14:56*	*12/12/18 13:58*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1C8

Lab Sample ID: 300-8734-9

Date Collected: 11/15/18 08:46
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0170	U		0.0860	0.370	0.0915	pCi/g	11/27/18 09:32	11/27/18 17:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0064	U	0.0271	0.0271	1.00	0.0722	pCi/g	11/27/18 11:50	12/05/18 08:50	1
Pu-239/240	-0.0016	U	0.0269	0.0269	1.00	0.0564	pCi/g	11/27/18 11:50	12/05/18 08:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*101*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0740**	**o**	0.0608	0.0619	1.00	0.0456	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	**0.0854**		0.0657	0.0670	1.00	0.0517	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	0.0124	U	0.0248	0.0249	1.00	0.0456	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*89.9*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.0	U	0.0778	1.17	15.0	2.12	pCi/g	11/27/18 14:56	12/12/18 18:09	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*11/27/18 14:56*	*12/12/18 18:09*	*1*

Client Sample ID: B3L1F1

Lab Sample ID: 300-8734-10

Date Collected: 11/15/18 11:17
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0395	U		0.0753	0.370	0.0942	pCi/g	11/27/18 09:32	11/27/18 17:38	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0051	U	0.0185	0.0185	1.00	0.0504	pCi/g	11/27/18 11:50	12/05/18 08:51	1
Pu-239/240	-0.00037	U	0.0183	0.0183	1.00	0.0336	pCi/g	11/27/18 11:50	12/05/18 08:51	1

Client Sample ID: B3L1F1

Lab Sample ID: 300-8734-10

Date Collected: 11/15/18 11:17
Date Received: 11/16/18 08:35

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	91.4		30 - 105	11/27/18 11:50	12/05/18 08:51	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0934**	**o**	0.0664	0.0679	1.00	0.0431	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	0.0324	U	0.0407	0.0410	1.00	0.0545	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	0.0117	U	0.0235	0.0236	1.00	0.0431	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	100		30 - 105	11/27/18 15:07	12/04/18 14:26	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.023	U	0.0286	0.877	15.0	1.51	pCi/g	11/27/18 14:56	12/12/18 20:14	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	91.4			11/27/18 14:56	12/12/18 20:14	1

Client Sample ID: B3L1F2

Lab Sample ID: 300-8734-11

Date Collected: 11/15/18 11:50
Date Received: 11/16/18 08:35

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0201	U		0.0772	0.370	0.0884	pCi/g	11/27/18 09:32	11/27/18 17:38	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0011	U	0.0272	0.0272	1.00	0.0536	pCi/g	11/27/18 11:50	12/05/18 08:51	1
Pu-239/240	-0.0011	U	0.0272	0.0272	1.00	0.0536	pCi/g	11/27/18 11:50	12/05/18 08:51	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	99.1		30 - 105	11/27/18 11:50	12/05/18 08:51	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.101**	**o**	0.0776	0.0793	1.00	0.0610	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	**0.0733**		0.0656	0.0666	1.00	0.0538	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	-0.00059	U	0.0294	0.0294	1.00	0.0538	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	79.6		30 - 105	11/27/18 15:07	12/04/18 14:26	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1F2

Lab Sample ID: 300-8734-11

Date Collected: 11/15/18 11:50
Matrix: Solid
Date Received: 11/16/18 08:35

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.56	U	0.0932	1.24	15.0	2.16	pCi/g	11/27/18 14:56	12/12/18 22:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.1*			*11/27/18 14:56*	*12/12/18 22:20*	*1*

Client Sample ID: B3L1C3

Lab Sample ID: 300-8734-12

Date Collected: 11/15/18 10:10
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.028	U		0.0918	0.370	0.0800	pCi/g	11/27/18 09:32	11/27/18 17:38	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0044	U	0.0245	0.0245	1.00	0.0609	pCi/g	11/27/18 11:50	12/05/18 08:51	1
Pu-239/240	0.000	U	0.0243	0.0243	1.00	0.0446	pCi/g	11/27/18 11:50	12/05/18 08:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.3*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.200**	**o**	0.0998	0.105	1.00	0.0458	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	**0.124**		0.0789	0.0813	1.00	0.0458	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	0.0125	U	0.0250	0.0250	1.00	0.0458	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.9*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.134	U	0.0422	1.14	15.0	1.94	pCi/g	11/27/18 14:56	12/13/18 00:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.3*			*11/27/18 14:56*	*12/13/18 00:25*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1D9

Lab Sample ID: 300-8734-13

Date Collected: 11/15/18 12:31
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0051	U		0.0864	0.370	0.0868	pCi/g	11/27/18 09:32	11/28/18 11:16	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0015	U	0.0247	0.0247	1.00	0.0514	pCi/g	11/27/18 11:50	12/05/18 08:51	1
Pu-239/240	-0.00049	U	0.0247	0.0247	1.00	0.0453	pCi/g	11/27/18 11:50	12/05/18 08:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.2*		*30 - 105*	*11/27/18 11:50*	*12/05/18 08:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.126**	**o**	0.0838	0.0862	1.00	0.0512	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	**0.221**		0.112	0.117	1.00	0.0628	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	-0.00056	U	0.0279	0.0279	1.00	0.0512	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*75.5*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:26*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.50	U	0.0503	1.11	15.0	1.98	pCi/g	11/27/18 14:56	12/13/18 02:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.2*			*11/27/18 14:56*	*12/13/18 02:30*	*1*

Client Sample ID: B3L1D4

Lab Sample ID: 300-8734-14

Date Collected: 11/15/18 10:30
Matrix: Solid
Date Received: 11/16/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0054	U		0.0929	0.370	0.0924	pCi/g	11/27/18 09:32	11/28/18 11:16	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00998	U	0.0335	0.0336	1.00	0.0852	pCi/g	11/27/18 11:50	12/05/18 08:51	1
Pu-239/240	-0.00067	U	0.0333	0.0333	1.00	0.0611	pCi/g	11/27/18 11:50	12/05/18 08:51	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1D4

Date Collected: 11/15/18 10:30
Date Received: 11/16/18 08:35

Lab Sample ID: 300-8734-14

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	82.4		30 - 105	11/27/18 11:50	12/05/18 08:51	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.153	o	0.0975	0.100	1.00	0.0566	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-233/234	0.0302	U	0.0436	0.0439	1.00	0.0566	pCi/g	11/27/18 15:07	12/04/18 14:26	1
U-235/236	0.000	U	0.0308	0.0308	1.00	0.0566	pCi/g	11/27/18 15:07	12/04/18 14:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	82.7		30 - 105	11/27/18 15:07	12/04/18 14:26	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.430	U	0.0477	1.62	15.0	2.78	pCi/g	11/27/18 14:56	12/13/18 04:36	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	82.4			11/27/18 14:56	12/13/18 04:36	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8734-1	B3L1F8	89.9
300-8734-1 DU	B3L1F8	93.5
300-8734-2	B3L1D2	94.9
300-8734-3	B3L1D3	88.1
300-8734-4	B3L1C7	87.9
300-8734-5	B3L1C4	83.4
300-8734-6	B3L1D6	85.7
300-8734-7	B3L1F0	99.5
300-8734-8	B3L1F5	74.3
300-8734-9	B3L1C8	101
300-8734-10	B3L1F1	91.4
300-8734-11	B3L1F2	99.1
300-8734-12	B3L1C3	96.3
300-8734-13	B3L1D9	83.2
300-8734-14	B3L1D4	82.4
LCS 300-16111/2-A	Lab Control Sample	97.6
MB 300-16111/1-A	Method Blank	90.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8734-1	B3L1F8	89.6
300-8734-1 DU	B3L1F8	78.4
300-8734-2	B3L1D2	96.4
300-8734-3	B3L1D3	86.7
300-8734-4	B3L1C7	85.3
300-8734-5	B3L1C4	99.0
300-8734-6	B3L1D6	92.8
300-8734-7	B3L1F0	84.2
300-8734-8	B3L1F5	87.2
300-8734-9	B3L1C8	89.9
300-8734-10	B3L1F1	100
300-8734-11	B3L1F2	79.6
300-8734-12	B3L1C3	81.9
300-8734-13	B3L1D9	75.5
300-8734-14	B3L1D4	82.7
LCS 300-16137/2-A	Lab Control Sample	81.6
MB 300-16137/1-A	Method Blank	83.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8734-1	B3L1F8	89.9							
300-8734-1 DU	B3L1F8	93.5							
300-8734-2	B3L1D2	94.9							
300-8734-3	B3L1D3	88.1							
300-8734-4	B3L1C7	87.9							
300-8734-5	B3L1C4	83.4							
300-8734-6	B3L1D6	85.7							
300-8734-7	B3L1F0	99.5							
300-8734-8	B3L1F5	74.3							
300-8734-9	B3L1C8	101							
300-8734-10	B3L1F1	91.4							
300-8734-11	B3L1F2	99.1							
300-8734-12	B3L1C3	96.3							
300-8734-13	B3L1D9	83.2							
300-8734-14	B3L1D4	82.4							
LCS 300-16134/2-A	Lab Control Sample	97.6							
MB 300-16134/1-A	Method Blank	90.4							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16098/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0118	U		0.0136	0.370	0.0442	pCi/g	11/27/18 09:32	11/27/18 15:48	1

Lab Sample ID: LCS 300-16098/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.64	2.313		0.181	0.370	0.101	pCi/g	88	80 - 120		

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.032	U		-0.0446	U y	0.0949	0.370	0.0780	pCi/g			34	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16137/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16428 — **Prep Batch: 16137**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00714	U	0.0277	0.0278	1.00	0.0744	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-233/234	-0.00275	U	0.0276	0.0276	1.00	0.0618	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-235/236	-0.00110	U	0.0275	0.0275	1.00	0.0542	pCi/g	11/27/18 15:07	12/04/18 14:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.1*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:24*	*1*

Lab Sample ID: LCS 300-16137/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16428 — **Prep Batch: 16137**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.41	2.665	o	0.578	1.00	0.0685	pCi/g	78	80 - 120		
U-233/234			3.26	3.563		0.725	1.00	0.0722	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*81.6*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16428 — **Prep Batch: 16137**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0541	U o		0.0682	U o	0.0661	1.00	0.0714	pCi/g			23	30
U-233/234	0.218			0.0548	U y	0.0590	1.00	0.0677	pCi/g			120	30
U-235/236	-0.0064	U		-0.000583	U y	0.0292	1.00	0.0535	pCi/g			167	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*78.4*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16111/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16397 — **Prep Batch: 16111**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00895	U	0.0323	0.0323	1.00	0.0881	pCi/g	11/27/18 11:50	12/04/18 17:24	1
Pu-239/240	-0.00192	U	0.0320	0.0320	1.00	0.0665	pCi/g	11/27/18 11:50	12/04/18 17:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.4*		*30 - 105*	*11/27/18 11:50*	*12/04/18 17:24*	*1*

Lab Sample ID: LCS 300-16111/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16397 — **Prep Batch: 16111**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.45	4.926		0.921	1.00	0.0579	pCi/g	111	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.6*		*30 - 105*

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16397 — **Prep Batch: 16111**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.00723	U		-0.00502	U y	0.0316	1.00	0.0768	pCi/g			1110	30
Pu-239/240	-0.0072	U		-0.00314	U y	0.0315	1.00	0.0706	pCi/g			79	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*93.5*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16134/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	2.360	U	0.142	1.59	15.0	2.51	pCi/g	11/27/18 14:56	12/11/18 17:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.4*			*11/27/18 14:56*	*12/11/18 17:05*	*1*

Lab Sample ID: LCS 300-16134/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			222	237.4		15.7	15.0	2.23	pCi/g	107	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*97.6*		

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.87	U		0.134	U y	1.43	15.0	2.44	pCi/g			173	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*93.5*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

General Chemistry

Analysis Batch: 16099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-1	B3L1F8	Total/NA	Solid	Moisture	
300-8734-2	B3L1D2	Total/NA	Solid	Moisture	
300-8734-3	B3L1D3	Total/NA	Solid	Moisture	
300-8734-4	B3L1C7	Total/NA	Solid	Moisture	
300-8734-5	B3L1C4	Total/NA	Solid	Moisture	
300-8734-6	B3L1D6	Total/NA	Solid	Moisture	
300-8734-7	B3L1F0	Total/NA	Solid	Moisture	
300-8734-8	B3L1F5	Total/NA	Solid	Moisture	
300-8734-9	B3L1C8	Total/NA	Solid	Moisture	
300-8734-10	B3L1F1	Total/NA	Solid	Moisture	
300-8734-11	B3L1F2	Total/NA	Solid	Moisture	
300-8734-12	B3L1C3	Total/NA	Solid	Moisture	
300-8734-13	B3L1D9	Total/NA	Solid	Moisture	
300-8734-14	B3L1D4	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16098

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-1	B3L1F8	Total/NA	Solid	Direct Addition	
300-8734-2	B3L1D2	Total/NA	Solid	Direct Addition	
300-8734-3	B3L1D3	Total/NA	Solid	Direct Addition	
300-8734-4	B3L1C7	Total/NA	Solid	Direct Addition	
300-8734-5	B3L1C4	Total/NA	Solid	Direct Addition	
300-8734-6	B3L1D6	Total/NA	Solid	Direct Addition	
300-8734-7	B3L1F0	Total/NA	Solid	Direct Addition	
300-8734-8	B3L1F5	Total/NA	Solid	Direct Addition	
300-8734-9	B3L1C8	Total/NA	Solid	Direct Addition	
300-8734-10	B3L1F1	Total/NA	Solid	Direct Addition	
300-8734-11	B3L1F2	Total/NA	Solid	Direct Addition	
300-8734-12	B3L1C3	Total/NA	Solid	Direct Addition	
300-8734-13	B3L1D9	Total/NA	Solid	Direct Addition	
300-8734-14	B3L1D4	Total/NA	Solid	Direct Addition	
MB 300-16098/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16098/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8734-1 DU	B3L1F8	Total/NA	Solid	Direct Addition	

Prep Batch: 16111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-1	B3L1F8	Total/NA	Solid	ExtChrAct	
300-8734-2	B3L1D2	Total/NA	Solid	ExtChrAct	
300-8734-3	B3L1D3	Total/NA	Solid	ExtChrAct	
300-8734-4	B3L1C7	Total/NA	Solid	ExtChrAct	
300-8734-5	B3L1C4	Total/NA	Solid	ExtChrAct	
300-8734-6	B3L1D6	Total/NA	Solid	ExtChrAct	
300-8734-7	B3L1F0	Total/NA	Solid	ExtChrAct	
300-8734-8	B3L1F5	Total/NA	Solid	ExtChrAct	
300-8734-9	B3L1C8	Total/NA	Solid	ExtChrAct	
300-8734-10	B3L1F1	Total/NA	Solid	ExtChrAct	
300-8734-11	B3L1F2	Total/NA	Solid	ExtChrAct	

Rad (Continued)

Prep Batch: 16111 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-12	B3L1C3	Total/NA	Solid	ExtChrAct	
300-8734-13	B3L1D9	Total/NA	Solid	ExtChrAct	
300-8734-14	B3L1D4	Total/NA	Solid	ExtChrAct	
MB 300-16111/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16111/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8734-1 DU	B3L1F8	Total/NA	Solid	ExtChrAct	

Prep Batch: 16134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-1	B3L1F8	Total/NA	Solid	ExtChr_LSC	
300-8734-2	B3L1D2	Total/NA	Solid	ExtChr_LSC	
300-8734-3	B3L1D3	Total/NA	Solid	ExtChr_LSC	
300-8734-4	B3L1C7	Total/NA	Solid	ExtChr_LSC	
300-8734-5	B3L1C4	Total/NA	Solid	ExtChr_LSC	
300-8734-6	B3L1D6	Total/NA	Solid	ExtChr_LSC	
300-8734-7	B3L1F0	Total/NA	Solid	ExtChr_LSC	
300-8734-8	B3L1F5	Total/NA	Solid	ExtChr_LSC	
300-8734-9	B3L1C8	Total/NA	Solid	ExtChr_LSC	
300-8734-10	B3L1F1	Total/NA	Solid	ExtChr_LSC	
300-8734-11	B3L1F2	Total/NA	Solid	ExtChr_LSC	
300-8734-12	B3L1C3	Total/NA	Solid	ExtChr_LSC	
300-8734-13	B3L1D9	Total/NA	Solid	ExtChr_LSC	
300-8734-14	B3L1D4	Total/NA	Solid	ExtChr_LSC	
MB 300-16134/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16134/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8734-1 DU	B3L1F8	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8734-1	B3L1F8	Total/NA	Solid	ExtChrAct	
300-8734-2	B3L1D2	Total/NA	Solid	ExtChrAct	
300-8734-3	B3L1D3	Total/NA	Solid	ExtChrAct	
300-8734-4	B3L1C7	Total/NA	Solid	ExtChrAct	
300-8734-5	B3L1C4	Total/NA	Solid	ExtChrAct	
300-8734-6	B3L1D6	Total/NA	Solid	ExtChrAct	
300-8734-7	B3L1F0	Total/NA	Solid	ExtChrAct	
300-8734-8	B3L1F5	Total/NA	Solid	ExtChrAct	
300-8734-9	B3L1C8	Total/NA	Solid	ExtChrAct	
300-8734-10	B3L1F1	Total/NA	Solid	ExtChrAct	
300-8734-11	B3L1F2	Total/NA	Solid	ExtChrAct	
300-8734-12	B3L1C3	Total/NA	Solid	ExtChrAct	
300-8734-13	B3L1D9	Total/NA	Solid	ExtChrAct	
300-8734-14	B3L1D4	Total/NA	Solid	ExtChrAct	
MB 300-16137/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16137/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8734-1 DU	B3L1F8	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1F8

Lab Sample ID: 300-8734-1

Date Collected: 11/15/18 09:22

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	394.45 g	394.45 g	16176	11/27/18 15:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	16428	12/04/18 14:24	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16397	12/04/18 17:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	16771	12/11/18 21:15	DJ	TAL RCH

Client Sample ID: B3L1D2

Lab Sample ID: 300-8734-2

Date Collected: 11/15/18 09:22

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	372.73 g	372.73 g	16176	11/27/18 15:49	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.45 g	1.45 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.96 g	0.96 g	16397	12/04/18 17:26	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.96 g	0.96 g	16771	12/12/18 01:26	DJ	TAL RCH

Client Sample ID: B3L1D3

Lab Sample ID: 300-8734-3

Date Collected: 11/15/18 11:32

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	324.04 g	324.04 g	16176	11/27/18 16:43	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.33 g	1.33 g	16397	12/04/18 17:27	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.33 g	1.33 g	16771	12/12/18 03:31	DJ	TAL RCH

Client Sample ID: B3L1C7

Lab Sample ID: 300-8734-4

Date Collected: 11/15/18 11:03

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.26 g	358.26 g	16176	11/27/18 16:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	16397	12/05/18 08:49	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.12 g	1.12 g	16771	12/12/18 05:37	DJ	TAL RCH

Client Sample ID: B3L1C4

Lab Sample ID: 300-8734-5

Date Collected: 11/15/18 10:47

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	379.73 g	379.73 g	16176	11/27/18 16:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	16397	12/05/18 08:50	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.28 g	1.28 g	16771	12/12/18 07:42	DJ	TAL RCH

Client Sample ID: B3L1D6

Lab Sample ID: 300-8734-6

Date Collected: 11/15/18 12:11

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	411.85 g	411.85 g	16176	11/27/18 16:45	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.63 g	1.63 g	16397	12/05/18 08:50	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.63 g	1.63 g	16771	12/12/18 09:47	DJ	TAL RCH

Client Sample ID: B3L1F0

Lab Sample ID: 300-8734-7

Date Collected: 11/15/18 09:52

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	383.51 g	383.51 g	16176	11/27/18 16:44	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.45 g	1.45 g	16428	12/04/18 14:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.19 g	1.19 g	16397	12/05/18 08:50	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.19 g	1.19 g	16771	12/12/18 11:53	DJ	TAL RCH

Client Sample ID: B3L1F5

Lab Sample ID: 300-8734-8

Date Collected: 11/15/18 09:03

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	348.01 g	348.01 g	16176	11/27/18 17:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16397	12/05/18 08:50	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.23 g	1.23 g	16771	12/12/18 13:58	DJ	TAL RCH

Client Sample ID: B3L1C8

Lab Sample ID: 300-8734-9

Date Collected: 11/15/18 08:46

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	379.28 g	379.28 g	16176	11/27/18 17:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16397	12/05/18 08:50	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16771	12/12/18 18:09	DJ	TAL RCH

Client Sample ID: B3L1F1

Lab Sample ID: 300-8734-10

Date Collected: 11/15/18 11:17

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	374.36 g	374.36 g	16176	11/27/18 17:38	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.62 g	1.62 g	16397	12/05/18 08:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.62 g	1.62 g	16771	12/12/18 20:14	DJ	TAL RCH

Client Sample ID: B3L1F2

Lab Sample ID: 300-8734-11

Date Collected: 11/15/18 11:50

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	370.27 g	370.27 g	16176	11/27/18 17:38	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16397	12/05/18 08:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.04 g	1.04 g	16771	12/12/18 22:20	DJ	TAL RCH

Client Sample ID: B3L1C3

Lab Sample ID: 300-8734-12

Date Collected: 11/15/18 10:10

Matrix: Solid

Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	378.45 g	378.45 g	16176	11/27/18 17:38	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.28 g	1.28 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.19 g	1.19 g	16397	12/05/18 08:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.19 g	1.19 g	16771	12/13/18 00:25	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Client Sample ID: B3L1D9

Lab Sample ID: 300-8734-13

Date Collected: 11/15/18 12:31
Matrix: Solid
Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	349.67 g	349.67 g	16176	11/28/18 11:16	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.38 g	1.38 g	16397	12/05/18 08:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.38 g	1.38 g	16771	12/13/18 02:30	DJ	TAL RCH

Client Sample ID: B3L1D4

Lab Sample ID: 300-8734-14

Date Collected: 11/15/18 10:30
Matrix: Solid
Date Received: 11/16/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16099	11/27/18 09:41	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16098	11/27/18 09:32	TDA	TAL RCH
Total/NA	Analysis	901.1		1	335.49 g	335.49 g	16176	11/28/18 11:16	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16137	11/27/18 15:07	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16428	12/04/18 14:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16111	11/27/18 11:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	16397	12/05/18 08:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16134	11/27/18 14:56	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.99 g	0.99 g	16771	12/13/18 04:36	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8734-1	B3L1F8	Solid	11/15/18 09:22	11/16/18 08:35
300-8734-2	B3L1D2	Solid	11/15/18 09:22	11/16/18 08:35
300-8734-3	B3L1D3	Solid	11/15/18 11:32	11/16/18 08:35
300-8734-4	B3L1C7	Solid	11/15/18 11:03	11/16/18 08:35
300-8734-5	B3L1C4	Solid	11/15/18 10:47	11/16/18 08:35
300-8734-6	B3L1D6	Solid	11/15/18 12:11	11/16/18 08:35
300-8734-7	B3L1F0	Solid	11/15/18 09:52	11/16/18 08:35
300-8734-8	B3L1F5	Solid	11/15/18 09:03	11/16/18 08:35
300-8734-9	B3L1C8	Solid	11/15/18 08:46	11/16/18 08:35
300-8734-10	B3L1F1	Solid	11/15/18 11:17	11/16/18 08:35
300-8734-11	B3L1F2	Solid	11/15/18 11:50	11/16/18 08:35
300-8734-12	B3L1C3	Solid	11/15/18 10:10	11/16/18 08:35
300-8734-13	B3L1D9	Solid	11/15/18 12:31	11/16/18 08:35
300-8734-14	B3L1D4	Solid	11/15/18 10:30	11/16/18 08:35

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-026	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL DUP2	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F8	N/A	SOIL	NOV 15 2018	0922	✓	✓

RL 8734-1
8734

300-8734 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC Mike Esparza	NOV 16 2018 0650
Mike Esparza /CHPRC Mike Esparza	NOV 16 2018 0835	Suzy Little Suzi Vitte TARC	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65495 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-010	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL-10	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D2	N/A	SOIL	NOV 15 2018	0972	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835		NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65479 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-011	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PL-11	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D3	N/A	SOIL	NOV 15 2018	1130	✓	✓

RL 8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	S. Hill Stan Vine TAMC	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65480 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-005	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL-5	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 5077 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C7	N/A	SOIL	NOV 15 2018	1103	✓	✓

RL 8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC [signature]	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC [signature]	NOV 16 2018 0650
Mike Esparza /CHPRC [signature]	NOV 16 2018 0835	[signature]	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65474 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-002	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL-2	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C4	N/A	SOIL	NOV 15 2018	1047	✓	✓

RL 8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC Mike Esparza	NOV 16 2018 0650
Mike Esparza /CHPRC Mike Esparza	NOV 16 2018 0835	Sy Kitts SVITS TAME	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65471 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-014	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL-14	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D6	N/A	SOIL	NOV 15 2018	1211	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	Suzi Vitas TASCE	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65483 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-018	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL J-28	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F0	N/A	SOIL	NOV 15 2018	0952	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0850	Mike Esparza /CHPRC	NOV 16 2018 0850
Mike Esparza /CHPRC	NOV 16 2018 0835		NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65487 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-023	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PL J-43	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F5	N/A	SOIL	NOV 15 2018	0903	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0835	Mike Esparza /CHPRC	NOV 16 2018 0835
Mike Esparza /CHPRC	NOV 16 2018 0835	Signature TAM	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65492 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-006	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL-6	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C8	N/A	SOIL	NOV 15 2018	0840	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	Sy Vill Suzi Vino	NOV 16 2018 0835

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65475 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-019	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL J-29	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F1	N/A	SOIL	NOV 15 2018	1117	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	S.VITE TAKL	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65488 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-020	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL J-30	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1F2	N/A	SOIL	NOV 15 2018	1150	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	S. Vines	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65489 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-001	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PL-1	PROJECT DESIGNATION RTL Pipelines - Rad		SAF NO. F18-046	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N-~~ 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1C3	N/A	SOIL	NOV 15 2018	1010	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	Signature Sitting	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65470 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-017	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PL J-27	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D9	N/A	SOIL	NOV 15 2018	1231	✓	✓

RL8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esperza /CHPRC	NOV 16 2018 0650
Mike Esperza /CHPRC	NOV 16 2018 0833	S Vito Suzi Vito	NOV 16 2018 0833

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65486 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-046-012	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PL-12	PROJECT DESIGNATION: RTL Pipelines - Rad		SAF NO.: F18-046	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L1D4	N/A	SOIL	NOV 1 5 2018	1030	✓	✓

RL 8734-1
8734

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC [signature]	NOV 1 5 2018 1330	SSU-1	NOV 1 5 2018 1330
SSU-1	NOV 1 6 2018 0650	Mike Esparza /CHPRC [signature]	NOV 1 6 2018 0650
Mike Esparza /CHPRC [signature]	NOV 1 6 2018 0835	[signature] SVITTE TRVL	NOV 1 6 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-166
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR65481 TRVL NUM = TRVL-18-166 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8734-1
SDG Number: RL8734-1

Login Number: 8734
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8912-1
TestAmerica Sample Delivery Group: RL8912-1
Client Project/Site: F18-048

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/31/2018 12:07:14 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8912-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8912-1

Comments
No additional comments.

Receipt
The samples were received on 12/6/2018 8:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2H2
Date Collected: 12/05/18 11:39
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0446	U		0.0809	0.370	0.0989	pCi/g	12/15/18 13:58	12/24/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0070	U	0.0235	0.0235	1.00	0.0650	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	-0.00046	U	0.0232	0.0232	1.00	0.0426	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.7*		*30 - 105*	*12/17/18 16:59*	*12/24/18 08:27*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.132**		0.0906	0.0930	1.00	0.0701	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-233/234	**0.0899**		0.0739	0.0753	1.00	0.0554	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-235/236	-0.00060	U	0.0302	0.0302	1.00	0.0554	pCi/g	12/17/18 17:06	12/27/18 12:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*70.4*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:41*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.0345	U	0.0831	1.25	15.0	2.48	pCi/g	12/17/18 17:21	12/29/18 13:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.7*			*12/17/18 17:21*	*12/29/18 13:25*	*1*

Client Sample ID: B3L2D4
Date Collected: 12/05/18 12:32
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.022	U		0.0980	0.370	0.0888	pCi/g	12/15/18 13:58	12/24/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0061	U	0.0384	0.0384	1.00	0.0935	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	0.000	U	0.0382	0.0382	1.00	0.0700	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Client Sample ID: B3L2D4
Date Collected: 12/05/18 12:32
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-2
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	78.1		30 - 105	12/17/18 16:59	12/24/18 08:27	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0652	U	0.0812	0.0819	1.00	0.128	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-233/234	0.0422	U	0.0572	0.0576	1.00	0.0861	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-235/236	0.0125	U	0.0331	0.0332	1.00	0.0765	pCi/g	12/17/18 17:06	12/27/18 12:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	87.6		30 - 105	12/17/18 17:06	12/27/18 12:41	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.477	U	0.240	2.07	15.0	4.02	pCi/g	12/17/18 17:21	12/29/18 15:30	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	78.1			12/17/18 17:21	12/29/18 15:30	1

Client Sample ID: B3L2F5
Date Collected: 12/05/18 13:20
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-3
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.15	U		0.162	0.370	0.101	pCi/g	12/15/18 13:58	12/24/18 09:33	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0025	U	0.0212	0.0212	1.00	0.0489	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	0.000	U	0.0211	0.0211	1.00	0.0387	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	98.3		30 - 105	12/17/18 16:59	12/24/18 08:27	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0122	U	0.0265	0.0266	1.00	0.0523	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-233/234	**0.145**		0.0879	0.0908	1.00	0.0486	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-235/236	-0.00053	U	0.0265	0.0265	1.00	0.0486	pCi/g	12/17/18 17:06	12/27/18 12:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	84.4		30 - 105	12/17/18 17:06	12/27/18 12:42	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.36	U	0.0814	1.14	15.0	2.33	pCi/g	12/17/18 17:21	12/29/18 16:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*98.3*			*12/17/18 17:21*	*12/29/18 16:32*	*1*

Client Sample ID: B3L2F2
Lab Sample ID: 300-8912-4

Date Collected: 12/05/18 11:52
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0591	U		0.0915	0.370	0.110	pCi/g	12/15/18 13:58	12/24/18 09:33	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0028	U	0.0285	0.0285	1.00	0.0638	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	0.0125	U	0.0284	0.0285	1.00	0.0590	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.4*		*30 - 105*	*12/17/18 16:59*	*12/24/18 08:27*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0975**		0.0797	0.0813	1.00	0.0597	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-233/234	**0.0975**		0.0797	0.0813	1.00	0.0597	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-235/236	0.0156	U	0.0325	0.0326	1.00	0.0597	pCi/g	12/17/18 17:06	12/27/18 12:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*71.2*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:42*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.31	U	0.179	1.53	15.0	3.06	pCi/g	12/17/18 17:21	12/29/18 17:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.4*			*12/17/18 17:21*	*12/29/18 17:34*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2D6
Date Collected: 12/05/18 10:15
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0122	U		0.0930	0.370	0.0997	pCi/g	12/15/18 13:58	12/24/18 09:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0012	U	0.0299	0.0299	1.00	0.0589	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	0.0143	U	0.0298	0.0299	1.00	0.0547	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*64.8*		*30 - 105*	*12/17/18 16:59*	*12/24/18 08:27*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0713**		0.0586	0.0596	1.00	0.0439	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-233/234	**0.107**		0.0718	0.0736	1.00	0.0473	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-235/236	-0.00048	U	0.0239	0.0239	1.00	0.0439	pCi/g	12/17/18 17:06	12/27/18 12:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*99.4*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:42*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.580	U	0.170	1.64	15.0	3.17	pCi/g	12/17/18 17:21	12/29/18 18:36	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*64.8*			*12/17/18 17:21*	*12/29/18 18:36*	*1*

Client Sample ID: B3L2F0
Date Collected: 12/05/18 11:22
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.060	U		0.127	0.370	0.0978	pCi/g	12/15/18 13:58	12/24/18 09:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0052	U	0.0324	0.0324	1.00	0.0789	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	-0.00064	U	0.0322	0.0322	1.00	0.0591	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2F0
Date Collected: 12/05/18 11:22
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-6
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	83.0		30 - 105	12/17/18 16:59	12/24/18 08:27	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.101		0.0671	0.0691	1.00	0.0411	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-233/234	0.145		0.0807	0.0840	1.00	0.0411	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-235/236	0.0215	U	0.0317	0.0318	1.00	0.0442	pCi/g	12/17/18 17:06	12/27/18 12:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	72.5		30 - 105	12/17/18 17:06	12/27/18 12:42	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.299	U	0.0857	1.77	15.0	3.50	pCi/g	12/17/18 17:21	12/29/18 19:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	83.0			12/17/18 17:21	12/29/18 19:38	1

Client Sample ID: B3L2F6
Date Collected: 12/05/18 12:05
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0050	U		0.0876	0.370	0.0864	pCi/g	12/15/18 13:58	12/24/18 09:34	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0044	U	0.0248	0.0248	1.00	0.0618	pCi/g	12/17/18 16:59	12/24/18 08:27	1
Pu-239/240	-0.0015	U	0.0247	0.0247	1.00	0.0513	pCi/g	12/17/18 16:59	12/24/18 08:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	92.8		30 - 105	12/17/18 16:59	12/24/18 08:27	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.100		0.0636	0.0654	1.00	0.0369	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-233/234	0.0804		0.0569	0.0582	1.00	0.0369	pCi/g	12/17/18 17:06	12/27/18 12:42	1
U-235/236	0.0101	U	0.0201	0.0202	1.00	0.0369	pCi/g	12/17/18 17:06	12/27/18 12:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	97.5		30 - 105	12/17/18 17:06	12/27/18 12:42	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.20	U	0.0850	1.28	15.0	2.57	pCi/g	12/17/18 17:21	12/29/18 20:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*92.8*			*12/17/18 17:21*	*12/29/18 20:40*	*1*

Client Sample ID: B3L2D9
Lab Sample ID: 300-8912-8

Date Collected: 12/05/18 10:33
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0434	U		0.0976	0.370	0.113	pCi/g	12/15/18 13:58	12/24/18 10:26	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0018	U	0.0227	0.0227	1.00	0.0491	pCi/g	12/17/18 16:59	12/24/18 10:54	1
Pu-239/240	-0.0027	U	0.0227	0.0227	1.00	0.0525	pCi/g	12/17/18 16:59	12/24/18 10:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.8*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:54*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0641**		0.0641	0.0649	1.00	0.0588	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	0.0320	U	0.0453	0.0456	1.00	0.0588	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.0160	U	0.0321	0.0322	1.00	0.0588	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*79.9*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.180	U	0.0586	1.04	15.0	2.06	pCi/g	12/17/18 17:21	12/29/18 21:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.8*			*12/17/18 17:21*	*12/29/18 21:42*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2H3
Date Collected: 12/05/18 09:58
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-9
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.011	U		0.0845	0.370	0.0634	pCi/g	12/15/18 13:58	12/24/18 10:26	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0022	U	0.0221	0.0221	1.00	0.0500	pCi/g	12/17/18 16:59	12/24/18 10:54	1
Pu-239/240	-0.0035	U	0.0221	0.0221	1.00	0.0544	pCi/g	12/17/18 16:59	12/24/18 10:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*101*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:54*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.150**		0.0955	0.0985	1.00	0.0596	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	**0.196**		0.109	0.113	1.00	0.0554	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.000	U	0.0302	0.0302	1.00	0.0554	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.6*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.25	U	0.0769	0.993	15.0	2.01	pCi/g	12/17/18 17:21	12/29/18 23:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*12/17/18 17:21*	*12/29/18 23:46*	*1*

Client Sample ID: B3L2D5
Date Collected: 12/05/18 09:42
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0279	U		0.0638	0.370	0.0825	pCi/g	12/15/18 13:58	12/24/18 10:26	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00613	U	0.0239	0.0239	1.00	0.0629	pCi/g	12/17/18 16:59	12/24/18 10:54	1
Pu-239/240	-0.011	U	0.0240	0.0241	1.00	0.0735	pCi/g	12/17/18 16:59	12/24/18 10:54	1

Client Sample ID: B3L2D5
Lab Sample ID: 300-8912-10
Date Collected: 12/05/18 09:42
Matrix: Solid
Date Received: 12/06/18 08:35

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	96.7		30 - 105	12/17/18 16:59	12/24/18 10:54	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.166**		0.0956	0.0990	1.00	0.0506	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	**0.0955**		0.0730	0.0745	1.00	0.0545	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.000	U	0.0276	0.0276	1.00	0.0506	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	85.2		30 - 105	12/17/18 17:06	12/27/18 12:43	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.04	U	0.108	1.33	15.0	2.53	pCi/g	12/17/18 17:21	12/30/18 00:48	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	96.7			12/17/18 17:21	12/30/18 00:48	1

Client Sample ID: B3L2H5
Lab Sample ID: 300-8912-11
Date Collected: 12/05/18 08:22
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.061	U		0.121	0.370	0.0971	pCi/g	12/15/18 13:58	12/24/18 10:27	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0125	U	0.0331	0.0331	1.00	0.0764	pCi/g	12/17/18 16:59	12/24/18 10:54	1
Pu-239/240	-0.0046	U	0.0331	0.0331	1.00	0.0785	pCi/g	12/17/18 16:59	12/24/18 10:54	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	80.3		30 - 105	12/17/18 16:59	12/24/18 10:54	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.104**		0.0691	0.0710	1.00	0.0423	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	**0.0691**		0.0564	0.0575	1.00	0.0423	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.000	U	0.0231	0.0231	1.00	0.0423	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	82.8		30 - 105	12/17/18 17:06	12/27/18 12:43	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.452	U	0.0583	1.76	15.0	3.47	pCi/g	12/17/18 17:21	12/30/18 01:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*80.3*			*12/17/18 17:21*	*12/30/18 01:50*	*1*

Client Sample ID: B3L2H1
Lab Sample ID: 300-8912-12

Date Collected: 12/05/18 12:58
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0061	U		0.0820	0.370	0.0751	pCi/g	12/15/18 13:58	12/24/18 10:27	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00055	U	0.0275	0.0275	1.00	0.0504	pCi/g	12/17/18 16:59	12/24/18 10:54	1
Pu-239/240	-0.0016	U	0.0275	0.0275	1.00	0.0571	pCi/g	12/17/18 16:59	12/24/18 10:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.3*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:54*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.106**		0.0751	0.0769	1.00	0.0488	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	**0.159**		0.0920	0.0953	1.00	0.0488	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.0133	U	0.0266	0.0267	1.00	0.0488	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*89.8*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.206	U	0.0655	1.24	15.0	2.44	pCi/g	12/17/18 17:21	12/30/18 02:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.3*			*12/17/18 17:21*	*12/30/18 02:52*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2F4
Date Collected: 12/05/18 09:22
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-13
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0215	U		0.0859	0.370	0.0901	pCi/g	12/15/18 13:58	12/24/18 11:20	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0059	U	0.0333	0.0333	1.00	0.0828	pCi/g	12/17/18 16:59	12/24/18 10:52	1
Pu-239/240	-0.0013	U	0.0331	0.0331	1.00	0.0652	pCi/g	12/17/18 16:59	12/24/18 10:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.8*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.102**		0.0773	0.0790	1.00	0.0536	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-233/234	**0.101**		0.0773	0.0790	1.00	0.0577	pCi/g	12/17/18 17:06	12/27/18 12:43	1
U-235/236	0.000	U	0.0292	0.0292	1.00	0.0536	pCi/g	12/17/18 17:06	12/27/18 12:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.2*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:43*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.57	U	0.0951	1.74	15.0	3.54	pCi/g	12/17/18 17:21	12/30/18 03:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.8*			*12/17/18 17:21*	*12/30/18 03:54*	*1*

Client Sample ID: B3L2D8
Date Collected: 12/05/18 09:00
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-14
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0382	U		0.0756	0.370	0.0927	pCi/g	12/15/18 13:58	12/24/18 11:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0056	U	0.0314	0.0314	1.00	0.0782	pCi/g	12/17/18 16:59	12/24/18 10:52	1
Pu-239/240	0.0156	U	0.0312	0.0313	1.00	0.0572	pCi/g	12/17/18 16:59	12/24/18 10:52	1

Client Sample ID: B3L2D8
Lab Sample ID: 300-8912-14
Date Collected: 12/05/18 09:00
Matrix: Solid
Date Received: 12/06/18 08:35

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	80.4		30 - 105	12/17/18 16:59	12/24/18 10:52	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.200		0.111	0.115	1.00	0.0565	pCi/g	12/17/18 17:06	12/27/18 12:44	1
U-233/234	0.122		0.0872	0.0892	1.00	0.0608	pCi/g	12/17/18 17:06	12/27/18 12:44	1
U-235/236	0.0148	U	0.0308	0.0309	1.00	0.0565	pCi/g	12/17/18 17:06	12/27/18 12:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	89.0		30 - 105	12/17/18 17:06	12/27/18 12:44	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.691	U	0.0841	1.69	15.0	3.28	pCi/g	12/17/18 17:21	12/30/18 04:56	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	80.4			12/17/18 17:21	12/30/18 04:56	1

Client Sample ID: B3L2H7
Lab Sample ID: 300-8912-15
Date Collected: 12/05/18 08:36
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0410	U		0.0841	0.370	0.104	pCi/g	12/15/18 13:58	12/24/18 11:21	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0048	U	0.0483	0.0483	1.00	0.108	pCi/g	12/17/18 16:59	12/24/18 10:52	1
Pu-239/240	-0.0029	U	0.0482	0.0482	1.00	0.100	pCi/g	12/17/18 16:59	12/24/18 10:52	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	60.0		30 - 105	12/17/18 16:59	12/24/18 10:52	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0335	U	0.0552	0.0555	1.00	0.0929	pCi/g	12/17/18 17:06	12/27/18 14:59	1
U-233/234	0.0755	U	0.0779	0.0789	1.00	0.0810	pCi/g	12/17/18 17:06	12/27/18 14:59	1
U-235/236	0.0187	U	0.0389	0.0391	1.00	0.0714	pCi/g	12/17/18 17:06	12/27/18 14:59	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	59.2		30 - 105	12/17/18 17:06	12/27/18 14:59	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.947	U	0.152	2.66	15.0	5.20	pCi/g	12/17/18 17:21	12/30/18 05:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*60.0*			*12/17/18 17:21*	*12/30/18 05:58*	*1*

Client Sample ID: B3L2H4
Lab Sample ID: 300-8912-16

Date Collected: 12/05/18 08:05
Matrix: Solid
Date Received: 12/06/18 08:35

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0534	U		0.0591	0.370	0.0938	pCi/g	12/15/18 13:58	12/24/18 11:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0118	U	0.0269	0.0270	1.00	0.0560	pCi/g	12/17/18 16:59	12/24/18 10:52	1
Pu-239/240	-0.0011	U	0.0269	0.0269	1.00	0.0531	pCi/g	12/17/18 16:59	12/24/18 10:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*89.9*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0397	U	0.0557	0.0560	1.00	0.0868	pCi/g	12/17/18 17:06	12/27/18 14:59	1
U-233/234	**0.140**		0.0961	0.0987	1.00	0.0744	pCi/g	12/17/18 17:06	12/27/18 14:59	1
U-235/236	-0.0019	U	0.0321	0.0321	1.00	0.0666	pCi/g	12/17/18 17:06	12/27/18 14:59	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*75.9*		*30 - 105*	*12/17/18 17:06*	*12/27/18 14:59*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.051	U	0.0920	1.43	15.0	2.86	pCi/g	12/17/18 17:21	12/30/18 07:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*89.9*			*12/17/18 17:21*	*12/30/18 07:00*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2F3

Date Collected: 12/05/18 08:36
Date Received: 12/06/18 08:35

Lab Sample ID: 300-8912-17

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0742	U		0.0768	0.370	0.106	pCi/g	12/15/18 13:58	12/24/18 11:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.011	U	0.0589	0.0589	1.00	0.146	pCi/g	12/17/18 16:59	12/24/18 10:52	1
Pu-239/240	-0.0023	U	0.0585	0.0585	1.00	0.115	pCi/g	12/17/18 16:59	12/24/18 10:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*44.9*		*30 - 105*	*12/17/18 16:59*	*12/24/18 10:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0679**		0.0553	0.0563	1.00	0.0627	pCi/g	12/17/18 17:06	12/27/18 15:00	1
U-233/234	**0.137**		0.0757	0.0786	1.00	0.0620	pCi/g	12/17/18 17:06	12/27/18 15:00	1
U-235/236	0.00819	U	0.0196	0.0196	1.00	0.0424	pCi/g	12/17/18 17:06	12/27/18 15:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.9*		*30 - 105*	*12/17/18 17:06*	*12/27/18 15:00*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.384	U	0.122	3.20	15.0	6.34	pCi/g	12/17/18 17:21	12/30/18 08:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*44.9*			*12/17/18 17:21*	*12/30/18 08:02*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8912-1	B3L2H2	90.7
300-8912-1 DU	B3L2H2	85.0
300-8912-2	B3L2D4	78.1
300-8912-3	B3L2F5	98.3
300-8912-4	B3L2F2	90.4
300-8912-5	B3L2D6	64.8
300-8912-6	B3L2F0	83.0
300-8912-7	B3L2F6	92.8
300-8912-8	B3L2D9	96.8
300-8912-9	B3L2H3	101
300-8912-10	B3L2D5	96.7
300-8912-11	B3L2H5	80.3
300-8912-12	B3L2H1	96.3
300-8912-13	B3L2F4	88.8
300-8912-14	B3L2D8	80.4
300-8912-15	B3L2H7	60.0
300-8912-16	B3L2H4	89.9
300-8912-17	B3L2F3	44.9
LCS 300-16745/2-B	Lab Control Sample	96.8
MB 300-16745/1-A	Method Blank	99.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8912-1	B3L2H2	70.4
300-8912-2	B3L2D4	87.6
300-8912-3	B3L2F5	84.4
300-8912-4	B3L2F2	71.2
300-8912-5	B3L2D6	99.4
300-8912-6	B3L2F0	72.5
300-8912-7	B3L2F6	97.5
300-8912-8	B3L2D9	79.9
300-8912-9	B3L2H3	80.6
300-8912-10	B3L2D5	85.2
300-8912-11	B3L2H5	82.8
300-8912-12	B3L2H1	89.8
300-8912-13	B3L2F4	80.2
300-8912-14	B3L2D8	89.0
300-8912-15	B3L2H7	59.2
300-8912-16	B3L2H4	75.9
300-8912-17	B3L2F3	84.9
LCS 300-16747/2-A	Lab Control Sample	73.3
MB 300-16747/1-A	Method Blank	76.3

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8912-1	B3L2H2	90.7							
300-8912-1 DU	B3L2H2	85.0							
300-8912-2	B3L2D4	78.1							
300-8912-3	B3L2F5	98.3							
300-8912-4	B3L2F2	90.4							
300-8912-5	B3L2D6	64.8							
300-8912-6	B3L2F0	83.0							
300-8912-7	B3L2F6	92.8							
300-8912-8	B3L2D9	96.8							
300-8912-9	B3L2H3	101							
300-8912-10	B3L2D5	96.7							
300-8912-11	B3L2H5	80.3							
300-8912-12	B3L2H1	96.3							
300-8912-13	B3L2F4	88.8							
300-8912-14	B3L2D8	80.4							
300-8912-15	B3L2H7	60.0							
300-8912-16	B3L2H4	89.9							
300-8912-17	B3L2F3	44.9							
LCS 300-16750/2-A	Lab Control Sample	108							
MB 300-16750/1-A	Method Blank	99.4							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16680/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0235	U		0.0193	0.370	0.0577	pCi/g	12/15/18 13:58	12/24/18 08:35	1

Lab Sample ID: LCS 300-16680/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.549		0.195	0.370	0.113	pCi/g	97	80 - 120

Lab Sample ID: 300-8912-1 DU — **Client Sample ID: B3L2H2**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0446	U	0.0285	U y	0.0711	0.370	0.0870	pCi/g	44	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16747/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17007 — **Prep Batch: 16747**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00507	U	0.0319	0.0319	1.00	0.0777	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-233/234	-0.00190	U	0.0318	0.0318	1.00	0.0660	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-235/236	-0.000634	U	0.0317	0.0317	1.00	0.0582	pCi/g	12/17/18 17:06	12/27/18 12:41	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*76.3*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:41*	*1*

Lab Sample ID: LCS 300-16747/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17007 — **Prep Batch: 16747**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.27	3.469		0.733	1.00	0.0740	pCi/g	106	80 - 120
U-233/234	3.12	3.582		0.752	1.00	0.0663	pCi/g	115	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*73.3*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16745/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00177	U	0.0301	0.0301	1.00	0.0966	pCi/g	12/17/18 16:59	12/24/18 08:26	1
Pu-239/240	0.000	U	0.0295	0.0295	1.00	0.0541	pCi/g	12/17/18 16:59	12/24/18 08:26	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.4*		*30 - 105*	*12/17/18 16:59*	*12/24/18 08:26*	*1*

Lab Sample ID: LCS 300-16745/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.63	5.237		1.04	1.00	0.0939	pCi/g	113	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*96.8*		*30 - 105*

Lab Sample ID: 300-8912-1 DU — **Client Sample ID: B3L2H2**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0070	U		-0.00681	U	0.0265	1.00	0.0710	pCi/g			2	30
Pu-239/240	-0.00046	U		-0.00105	U y	0.0262	1.00	0.0517	pCi/g			77	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*85.0*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16750/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17047 — **Prep Batch: 16750**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.533	U	0.169	1.51	15.0	3.05	pCi/g	12/17/18 17:21	12/29/18 11:21	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.4*			*12/17/18 17:21*	*12/29/18 11:21*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Lab Sample ID: LCS 300-16750/2-A
Matrix: Solid
Analysis Batch: 17047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16750

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	211.9		14.1	15.0	3.01	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*108*		

Lab Sample ID: 300-8912-1 DU
Matrix: Solid
Analysis Batch: 17047

Client Sample ID: B3L2H2
Prep Type: Total/NA
Prep Batch: 16750

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.0345	U		0.481	U y	1.44	15.0	2.82	pCi/g			173	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*85.0*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

General Chemistry

Analysis Batch: 16737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-1	B3L2H2	Total/NA	Solid	Moisture	
300-8912-2	B3L2D4	Total/NA	Solid	Moisture	
300-8912-3	B3L2F5	Total/NA	Solid	Moisture	
300-8912-4	B3L2F2	Total/NA	Solid	Moisture	
300-8912-5	B3L2D6	Total/NA	Solid	Moisture	
300-8912-6	B3L2F0	Total/NA	Solid	Moisture	
300-8912-7	B3L2F6	Total/NA	Solid	Moisture	
300-8912-8	B3L2D9	Total/NA	Solid	Moisture	
300-8912-9	B3L2H3	Total/NA	Solid	Moisture	
300-8912-10	B3L2D5	Total/NA	Solid	Moisture	
300-8912-11	B3L2H5	Total/NA	Solid	Moisture	
300-8912-12	B3L2H1	Total/NA	Solid	Moisture	
300-8912-13	B3L2F4	Total/NA	Solid	Moisture	
300-8912-14	B3L2D8	Total/NA	Solid	Moisture	
300-8912-15	B3L2H7	Total/NA	Solid	Moisture	
300-8912-16	B3L2H4	Total/NA	Solid	Moisture	
300-8912-17	B3L2F3	Total/NA	Solid	Moisture	
300-8912-1 DU	B3L2H2	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-1	B3L2H2	Total/NA	Solid	Direct Addition	
300-8912-2	B3L2D4	Total/NA	Solid	Direct Addition	
300-8912-3	B3L2F5	Total/NA	Solid	Direct Addition	
300-8912-4	B3L2F2	Total/NA	Solid	Direct Addition	
300-8912-5	B3L2D6	Total/NA	Solid	Direct Addition	
300-8912-6	B3L2F0	Total/NA	Solid	Direct Addition	
300-8912-7	B3L2F6	Total/NA	Solid	Direct Addition	
300-8912-8	B3L2D9	Total/NA	Solid	Direct Addition	
300-8912-9	B3L2H3	Total/NA	Solid	Direct Addition	
300-8912-10	B3L2D5	Total/NA	Solid	Direct Addition	
300-8912-11	B3L2H5	Total/NA	Solid	Direct Addition	
300-8912-12	B3L2H1	Total/NA	Solid	Direct Addition	
300-8912-13	B3L2F4	Total/NA	Solid	Direct Addition	
300-8912-14	B3L2D8	Total/NA	Solid	Direct Addition	
300-8912-15	B3L2H7	Total/NA	Solid	Direct Addition	
300-8912-16	B3L2H4	Total/NA	Solid	Direct Addition	
300-8912-17	B3L2F3	Total/NA	Solid	Direct Addition	
MB 300-16680/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16680/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8912-1 DU	B3L2H2	Total/NA	Solid	Direct Addition	

Prep Batch: 16745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-1	B3L2H2	Total/NA	Solid	ExtChrAct	
300-8912-2	B3L2D4	Total/NA	Solid	ExtChrAct	
300-8912-3	B3L2F5	Total/NA	Solid	ExtChrAct	
300-8912-4	B3L2F2	Total/NA	Solid	ExtChrAct	

Rad (Continued)

Prep Batch: 16745 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-5	B3L2D6	Total/NA	Solid	ExtChrAct	
300-8912-6	B3L2F0	Total/NA	Solid	ExtChrAct	
300-8912-7	B3L2F6	Total/NA	Solid	ExtChrAct	
300-8912-8	B3L2D9	Total/NA	Solid	ExtChrAct	
300-8912-9	B3L2H3	Total/NA	Solid	ExtChrAct	
300-8912-10	B3L2D5	Total/NA	Solid	ExtChrAct	
300-8912-11	B3L2H5	Total/NA	Solid	ExtChrAct	
300-8912-12	B3L2H1	Total/NA	Solid	ExtChrAct	
300-8912-13	B3L2F4	Total/NA	Solid	ExtChrAct	
300-8912-14	B3L2D8	Total/NA	Solid	ExtChrAct	
300-8912-15	B3L2H7	Total/NA	Solid	ExtChrAct	
300-8912-16	B3L2H4	Total/NA	Solid	ExtChrAct	
300-8912-17	B3L2F3	Total/NA	Solid	ExtChrAct	
MB 300-16745/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16745/2-B	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8912-1 DU	B3L2H2	Total/NA	Solid	ExtChrAct	

Prep Batch: 16747

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-1	B3L2H2	Total/NA	Solid	ExtChrAct	
300-8912-2	B3L2D4	Total/NA	Solid	ExtChrAct	
300-8912-3	B3L2F5	Total/NA	Solid	ExtChrAct	
300-8912-4	B3L2F2	Total/NA	Solid	ExtChrAct	
300-8912-5	B3L2D6	Total/NA	Solid	ExtChrAct	
300-8912-6	B3L2F0	Total/NA	Solid	ExtChrAct	
300-8912-7	B3L2F6	Total/NA	Solid	ExtChrAct	
300-8912-8	B3L2D9	Total/NA	Solid	ExtChrAct	
300-8912-9	B3L2H3	Total/NA	Solid	ExtChrAct	
300-8912-10	B3L2D5	Total/NA	Solid	ExtChrAct	
300-8912-11	B3L2H5	Total/NA	Solid	ExtChrAct	
300-8912-12	B3L2H1	Total/NA	Solid	ExtChrAct	
300-8912-13	B3L2F4	Total/NA	Solid	ExtChrAct	
300-8912-14	B3L2D8	Total/NA	Solid	ExtChrAct	
300-8912-15	B3L2H7	Total/NA	Solid	ExtChrAct	
300-8912-16	B3L2H4	Total/NA	Solid	ExtChrAct	
300-8912-17	B3L2F3	Total/NA	Solid	ExtChrAct	
MB 300-16747/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16747/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	

Prep Batch: 16750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-1	B3L2H2	Total/NA	Solid	ExtChr_LSC	
300-8912-2	B3L2D4	Total/NA	Solid	ExtChr_LSC	
300-8912-3	B3L2F5	Total/NA	Solid	ExtChr_LSC	
300-8912-4	B3L2F2	Total/NA	Solid	ExtChr_LSC	
300-8912-5	B3L2D6	Total/NA	Solid	ExtChr_LSC	
300-8912-6	B3L2F0	Total/NA	Solid	ExtChr_LSC	
300-8912-7	B3L2F6	Total/NA	Solid	ExtChr_LSC	
300-8912-8	B3L2D9	Total/NA	Solid	ExtChr_LSC	
300-8912-9	B3L2H3	Total/NA	Solid	ExtChr_LSC	
300-8912-10	B3L2D5	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Rad (Continued)

Prep Batch: 16750 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8912-11	B3L2H5	Total/NA	Solid	ExtChr_LSC	
300-8912-12	B3L2H1	Total/NA	Solid	ExtChr_LSC	
300-8912-13	B3L2F4	Total/NA	Solid	ExtChr_LSC	
300-8912-14	B3L2D8	Total/NA	Solid	ExtChr_LSC	
300-8912-15	B3L2H7	Total/NA	Solid	ExtChr_LSC	
300-8912-16	B3L2H4	Total/NA	Solid	ExtChr_LSC	
300-8912-17	B3L2F3	Total/NA	Solid	ExtChr_LSC	
MB 300-16750/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16750/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8912-1 DU	B3L2H2	Total/NA	Solid	ExtChr_LSC	

Client Sample ID: B3L2H2

Lab Sample ID: 300-8912-1

Date Collected: 12/05/18 11:39
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	348.88 g	348.88 g	16949	12/24/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.33 g	1.33 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	17007	12/27/18 12:41	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.33 g	1.33 g	17047	12/29/18 13:25	DJ	TAL RCH

Client Sample ID: B3L2D4

Lab Sample ID: 300-8912-2

Date Collected: 12/05/18 12:32
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.39 g	358.39 g	16949	12/24/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	17007	12/27/18 12:41	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.95 g	0.95 g	17047	12/29/18 15:30	DJ	TAL RCH

Client Sample ID: B3L2F5

Lab Sample ID: 300-8912-3

Date Collected: 12/05/18 13:20
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	342.36 g	342.36 g	16949	12/24/18 09:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.31 g	1.31 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	17007	12/27/18 12:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.31 g	1.31 g	17047	12/29/18 16:32	DJ	TAL RCH

Client Sample ID: B3L2F2

Lab Sample ID: 300-8912-4

Date Collected: 12/05/18 11:52
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	341.28 g	341.28 g	16949	12/24/18 09:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	17007	12/27/18 12:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.08 g	1.08 g	17047	12/29/18 17:34	DJ	TAL RCH

Client Sample ID: B3L2D6

Lab Sample ID: 300-8912-5

Date Collected: 12/05/18 10:15
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	337.25 g	337.25 g	16949	12/24/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.45 g	1.45 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	17007	12/27/18 12:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.45 g	1.45 g	17047	12/29/18 18:36	DJ	TAL RCH

Client Sample ID: B3L2F0

Lab Sample ID: 300-8912-6

Date Collected: 12/05/18 11:22
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	349.42 g	349.42 g	16949	12/24/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.52 g	1.52 g	17007	12/27/18 12:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	17047	12/29/18 19:38	DJ	TAL RCH

Client Sample ID: B3L2F6

Lab Sample ID: 300-8912-7

Date Collected: 12/05/18 12:05
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	362.09 g	362.09 g	16949	12/24/18 09:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.25 g	1.25 g	16940	12/24/18 08:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.3 g	1.3 g	17007	12/27/18 12:42	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.25 g	1.25 g	17047	12/29/18 20:40	DJ	TAL RCH

Client Sample ID: B3L2D9

Lab Sample ID: 300-8912-8

Date Collected: 12/05/18 10:33
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	341.71 g	341.71 g	16949	12/24/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.5 g	1.5 g	16940	12/24/18 10:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.5 g	1.5 g	17047	12/29/18 21:42	DJ	TAL RCH

Client Sample ID: B3L2H3

Lab Sample ID: 300-8912-9

Date Collected: 12/05/18 09:58
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	387.08 g	387.08 g	16949	12/24/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.49 g	1.49 g	16940	12/24/18 10:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.49 g	1.49 g	17047	12/29/18 23:46	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2D5

Lab Sample ID: 300-8912-10

Date Collected: 12/05/18 09:42
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	353.61 g	353.61 g	16949	12/24/18 10:26	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.22 g	1.22 g	16940	12/24/18 10:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.22 g	1.22 g	17047	12/30/18 00:48	DJ	TAL RCH

Client Sample ID: B3L2H5

Lab Sample ID: 300-8912-11

Date Collected: 12/05/18 08:22
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	301.34 g	301.34 g	16949	12/24/18 10:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16940	12/24/18 10:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.32 g	1.32 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	17047	12/30/18 01:50	DJ	TAL RCH

Client Sample ID: B3L2H1

Lab Sample ID: 300-8912-12

Date Collected: 12/05/18 12:58
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	365.42 g	365.42 g	16949	12/24/18 10:27	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	16940	12/24/18 10:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.27 g	1.27 g	17047	12/30/18 02:52	DJ	TAL RCH

Client Sample ID: B3L2F4

Lab Sample ID: 300-8912-13

Date Collected: 12/05/18 09:22
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	382.68 g	382.68 g	16949	12/24/18 11:20	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	16940	12/24/18 10:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	17007	12/27/18 12:43	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.95 g	0.95 g	17047	12/30/18 03:54	DJ	TAL RCH

Client Sample ID: B3L2D8

Lab Sample ID: 300-8912-14

Date Collected: 12/05/18 09:00
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	326.05 g	326.05 g	16949	12/24/18 11:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16940	12/24/18 10:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.95 g	0.95 g	17007	12/27/18 12:44	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.13 g	1.13 g	17047	12/30/18 04:56	DJ	TAL RCH

Client Sample ID: B3L2H7

Lab Sample ID: 300-8912-15

Date Collected: 12/05/18 08:36
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	325.64 g	325.64 g	16949	12/24/18 11:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.96 g	0.96 g	16940	12/24/18 10:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	17007	12/27/18 14:59	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.96 g	0.96 g	17047	12/30/18 05:58	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Client Sample ID: B3L2H4

Lab Sample ID: 300-8912-16

Date Collected: 12/05/18 08:05
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	313.57 g	313.57 g	16949	12/24/18 11:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	16940	12/24/18 10:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	17007	12/27/18 14:59	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.16 g	1.16 g	17047	12/30/18 07:00	DJ	TAL RCH

Client Sample ID: B3L2F3

Lab Sample ID: 300-8912-17

Date Collected: 12/05/18 08:36
Matrix: Solid
Date Received: 12/06/18 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16737	12/17/18 14:40	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16680	12/15/18 13:58	TDA	TAL RCH
Total/NA	Analysis	901.1		1	331.08 g	331.08 g	16949	12/24/18 11:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16745	12/17/18 16:59	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.05 g	1.05 g	16940	12/24/18 10:52	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16747	12/17/18 17:06	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.56 g	1.56 g	17007	12/27/18 15:00	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16750	12/17/18 17:21	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.05 g	1.05 g	17047	12/30/18 08:02	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8912-1	B3L2H2	Solid	12/05/18 11:39	12/06/18 08:35
300-8912-2	B3L2D4	Solid	12/05/18 12:32	12/06/18 08:35
300-8912-3	B3L2F5	Solid	12/05/18 13:20	12/06/18 08:35
300-8912-4	B3L2F2	Solid	12/05/18 11:52	12/06/18 08:35
300-8912-5	B3L2D6	Solid	12/05/18 10:15	12/06/18 08:35
300-8912-6	B3L2F0	Solid	12/05/18 11:22	12/06/18 08:35
300-8912-7	B3L2F6	Solid	12/05/18 12:05	12/06/18 08:35
300-8912-8	B3L2D9	Solid	12/05/18 10:33	12/06/18 08:35
300-8912-9	B3L2H3	Solid	12/05/18 09:58	12/06/18 08:35
300-8912-10	B3L2D5	Solid	12/05/18 09:42	12/06/18 08:35
300-8912-11	B3L2H5	Solid	12/05/18 08:22	12/06/18 08:35
300-8912-12	B3L2H1	Solid	12/05/18 12:58	12/06/18 08:35
300-8912-13	B3L2F4	Solid	12/05/18 09:22	12/06/18 08:35
300-8912-14	B3L2D8	Solid	12/05/18 09:00	12/06/18 08:35
300-8912-15	B3L2H7	Solid	12/05/18 08:36	12/06/18 08:35
300-8912-16	B3L2H4	Solid	12/05/18 08:05	12/06/18 08:35
300-8912-17	B3L2F3	Solid	12/05/18 08:36	12/06/18 08:35

D379

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-019	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA J-37	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H2	N/A	SOIL	DEC 05 2018	1139	✓	✓

8912

300-8912 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burgland CHPRC	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65574 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-001	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-1	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2D4	N/A	SOIL	DEC 05 2018	1232	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
~~SSU-1~~ Jeff Lucas /CHPRC 12-6-18	DEC 06 2018 0835	Charlotte Bughard	DEC 06 2018 0835

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65556 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-012	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-12	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F5	N/A	SOIL	DEC 05 2018	KT 12-5-18 1258 1330	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burgland TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65567 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-009	PAGE 1 OF 1
COLLECTOR: Malcom Chunn, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA-9	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F2	N/A	SOIL	DEC 05 2018	1152	✓	✓

8912

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1130	SSU-1	DEC 05 2018 1130
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Bughard TARU	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65564 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-003	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA-3	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2D6	N/A	SOIL	DEC 05 2018	1015	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlotte Burghard TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65558 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-007	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-7	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F0	N/A	SOIL	DEC 05 2018	~~1000~~ 1120 KT 12-5-18	✓	✓

8912

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlie Vaughn	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65562 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-013	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-13	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8912

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F6	N/A	SOIL	DEC 05 2018	1205	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Bugliarello CH2MHill	DEC 06 2018 0835

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65568 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-006	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA-6	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2D9	N/A	SOIL	DEC 05 2018	1033	✓	✓

3912

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlotte Burghard TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65561 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-020	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA J-38	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H3	N/A	SOIL	DEC 05 2018	0958	✓	✓

8972

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlotte Bughard TAKL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65575 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-002	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-2	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2D5	N/A	SOIL	DEC 05 2018	0942	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Langford CB TAKE	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65557 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-022	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA J-40	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H5	N/A	SOIL	DEC 05 2018	0800	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burghard	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65577 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-018	PAGE 1 OF 1
COLLECTOR Malcom Chunn	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PA J-36	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H1	N/A	SOIL	DEC 05 2018	1258	✓	✓

8912

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burgess CB TARC	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65573 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-011	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA-11	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
DOE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F4	N/A	SOIL	DEC 05 2018	0922	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Bughers	DEC 06 2018 0835

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65566 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-005	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA-5	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2D8	N/A	SOIL	DEC 05 2018	0900	✓	✓

8912

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Bryant TAPC	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65560 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-024	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL PA DUP1	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8912

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H7	N/A	SOIL	DEC 05 2018	0836	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burghard TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65579 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-021	PAGE 1 OF 1
COLLECTOR KT 12-5-18 ~~Kathy Turner /CHPRC~~ Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PA J-39	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8912

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H4	N/A	SOIL	DEC 05 2018	0805	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Cheslette Burghard TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65576 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-010	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL PA-10	PROJECT DESIGNATION: RTL Paved Areas - Rad		SAF NO.: F18-048	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F3	N/A	SOIL	DEC 05 2018	~~DEC 05 2018~~ RT 12:18 08360	✓	✓

89 12

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 05 2018 1430	SSU-1	DEC 05 2018 1430
SSU-1	DEC 06 2018 0700	Jeff Lucas /CHPRC	DEC 06 2018 0700
Jeff Lucas /CHPRC	DEC 06 2018 0835	Charlette Burgess TARL	DEC 06 2018 0835

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65565 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8912-1
SDG Number: RL8912-1

Login Number: 8912
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8932-1
TestAmerica Sample Delivery Group: RL8932-1
Client Project/Site: F18-048

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/31/2018 12:24:45 PM

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LINKS

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I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8932-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8932-1

Comments
No additional comments.

Receipt
The samples were received on 12/7/2018 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Client Sample ID: B3L2H6
Date Collected: 12/06/18 08:42
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8932-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0125	U		0.0836	0.370	0.0862	pCi/g	12/18/18 16:59	12/26/18 09:29	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0045	U	0.0282	0.0282	1.00	0.0685	pCi/g	12/19/18 09:05	12/27/18 12:05	1
Pu-239/240	-0.00056	U	0.0280	0.0280	1.00	0.0513	pCi/g	12/19/18 09:05	12/27/18 12:05	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*94.4*		*30 - 105*	*12/19/18 09:05*	*12/27/18 12:05*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0495	U	0.0510	0.0516	1.00	0.0531	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-233/234	**0.0893**		0.0675	0.0689	1.00	0.0468	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-235/236	0.000	U	0.0255	0.0255	1.00	0.0468	pCi/g	12/19/18 11:35	12/27/18 15:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*90.2*		*30 - 105*	*12/19/18 11:35*	*12/27/18 15:02*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.49	U	0.188	1.61	15.0	2.90	pCi/g	12/19/18 11:08	12/28/18 21:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.4*			*12/19/18 11:08*	*12/28/18 21:38*	*1*

Client Sample ID: B3L2H0
Date Collected: 12/06/18 09:08
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8932-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.046	U		0.103	0.370	0.0848	pCi/g	12/18/18 16:59	12/26/18 09:29	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00707	U	0.0298	0.0298	1.00	0.0798	pCi/g	12/19/18 09:05	12/27/18 12:05	1
Pu-239/240	-0.0018	U	0.0295	0.0295	1.00	0.0613	pCi/g	12/19/18 09:05	12/27/18 12:05	1

Client Sample ID: B3L2H0
Lab Sample ID: 300-8932-2
Date Collected: 12/06/18 09:08
Matrix: Solid
Date Received: 12/07/18 09:50

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	86.6		30 - 105	12/19/18 09:05	12/27/18 12:05	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.166		0.0923	0.0959	1.00	0.0470	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-233/234	0.115		0.0768	0.0789	1.00	0.0470	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-235/236	0.0128	U	0.0256	0.0257	1.00	0.0470	pCi/g	12/19/18 11:35	12/27/18 15:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	86.3		30 - 105	12/19/18 11:35	12/27/18 15:03	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.37	U	0.164	1.69	15.0	3.05	pCi/g	12/19/18 11:08	12/28/18 23:48	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	86.6			12/19/18 11:08	12/28/18 23:48	1

Client Sample ID: B3L2F9
Lab Sample ID: 300-8932-3
Date Collected: 12/06/18 09:20
Matrix: Solid
Date Received: 12/07/18 09:50

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0152	U		0.0734	0.370	0.0832	pCi/g	12/18/18 16:59	12/26/18 09:30	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00984	U	0.0275	0.0275	1.00	0.0652	pCi/g	12/19/18 09:05	12/27/18 12:05	1
Pu-239/240	-0.00055	U	0.0273	0.0273	1.00	0.0501	pCi/g	12/19/18 09:05	12/27/18 12:05	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	86.4		30 - 105	12/19/18 09:05	12/27/18 12:05	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.176		0.0808	0.0853	1.00	0.0340	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-233/234	0.130		0.0694	0.0722	1.00	0.0340	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-235/236	0.00927	U	0.0186	0.0186	1.00	0.0340	pCi/g	12/19/18 11:35	12/27/18 15:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	87.1		30 - 105	12/19/18 11:35	12/27/18 15:03	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.26	U	0.136	1.63	15.0	2.95	pCi/g	12/19/18 11:08	12/29/18 00:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.4*			*12/19/18 11:08*	*12/29/18 00:53*	*1*

Client Sample ID: B3L2F8

Lab Sample ID: 300-8932-4

Date Collected: 12/06/18 09:47
Date Received: 12/07/18 09:50

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.025	U		0.122	0.370	0.105	pCi/g	12/18/18 16:59	12/26/18 10:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00764	U	0.0484	0.0484	1.00	0.138	pCi/g	12/19/18 09:05	12/27/18 12:06	1
Pu-239/240	-0.0038	U	0.0479	0.0479	1.00	0.104	pCi/g	12/19/18 09:05	12/27/18 12:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*57.6*		*30 - 105*	*12/19/18 09:05*	*12/27/18 12:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.115**		0.0815	0.0835	1.00	0.0529	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-233/234	0.0421	U	0.0499	0.0504	1.00	0.0569	pCi/g	12/19/18 11:35	12/27/18 15:03	1
U-235/236	0.000	U	0.0288	0.0288	1.00	0.0529	pCi/g	12/19/18 11:35	12/27/18 15:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.6*		*30 - 105*	*12/19/18 11:35*	*12/27/18 15:03*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	4.05	U	0.370	2.95	15.0	5.13	pCi/g	12/19/18 11:08	12/29/18 01:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*57.6*			*12/19/18 11:08*	*12/29/18 01:58*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Client Sample ID: B3L2F1
Date Collected: 12/06/18 10:50
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8932-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.037	U		0.0985	0.370	0.0796	pCi/g	12/18/18 16:59	12/26/18 10:22	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.010	U	0.0331	0.0332	1.00	0.0929	pCi/g	12/19/18 09:05	12/27/18 12:06	1
Pu-239/240	-0.0026	U	0.0328	0.0328	1.00	0.0709	pCi/g	12/19/18 09:05	12/27/18 12:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*81.4*		*30 - 105*	*12/19/18 09:05*	*12/27/18 12:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.157**		0.0994	0.103	1.00	0.0577	pCi/g	12/19/18 11:35	12/27/18 15:04	1
U-233/234	**0.0767**		0.0703	0.0714	1.00	0.0654	pCi/g	12/19/18 11:35	12/27/18 15:04	1
U-235/236	-0.00063	U	0.0314	0.0314	1.00	0.0577	pCi/g	12/19/18 11:35	12/27/18 15:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*82.1*		*30 - 105*	*12/19/18 11:35*	*12/27/18 15:04*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.682	U	0.103	1.88	15.0	3.48	pCi/g	12/19/18 11:08	12/29/18 03:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*81.4*			*12/19/18 11:08*	*12/29/18 03:03*	*1*

Client Sample ID: B3L2F7
Date Collected: 12/06/18 11:15
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8932-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0274	U		0.0868	0.370	0.0972	pCi/g	12/18/18 16:59	12/26/18 10:23	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00477	U	0.0268	0.0268	1.00	0.0752	pCi/g	12/19/18 09:05	12/27/18 12:06	1
Pu-239/240	-0.0021	U	0.0265	0.0266	1.00	0.0575	pCi/g	12/19/18 09:05	12/27/18 12:06	1

Client Sample ID: B3L2F7
Lab Sample ID: 300-8932-6
Date Collected: 12/06/18 11:15
Matrix: Solid
Date Received: 12/07/18 09:50

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	91.2		30 - 105	12/19/18 09:05	12/27/18 12:06	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.139**		0.0823	0.0850	1.00	0.0567	pCi/g	12/19/18 11:35	12/28/18 07:27	1
U-233/234	**0.139**		0.0823	0.0850	1.00	0.0582	pCi/g	12/19/18 11:35	12/28/18 07:27	1
U-235/236	-0.00048	U	0.0238	0.0238	1.00	0.0436	pCi/g	12/19/18 11:35	12/28/18 07:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	88.4		30 - 105	12/19/18 11:35	12/28/18 07:27	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.285	U	0.0768	1.42	15.0	2.64	pCi/g	12/19/18 11:08	12/29/18 04:09	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	91.2			12/19/18 11:08	12/29/18 04:09	1

Client Sample ID: B3L2D7
Lab Sample ID: 300-8932-7
Date Collected: 12/06/18 11:50
Matrix: Solid
Date Received: 12/07/18 09:50

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0552	U		0.0679	0.370	0.0963	pCi/g	12/18/18 16:59	12/26/18 10:23	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.012	U	0.0312	0.0313	1.00	0.0922	pCi/g	12/19/18 09:05	12/27/18 12:06	1
Pu-239/240	0.0129	U	0.0308	0.0309	1.00	0.0667	pCi/g	12/19/18 09:05	12/27/18 12:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	86.8		30 - 105	12/19/18 09:05	12/27/18 12:06	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.138**		0.0991	0.102	1.00	0.0938	pCi/g	12/19/18 11:35	12/28/18 07:27	1
U-233/234	**0.0944**		0.0809	0.0823	1.00	0.0788	pCi/g	12/19/18 11:35	12/28/18 07:27	1
U-235/236	-0.0020	U	0.0331	0.0331	1.00	0.0687	pCi/g	12/19/18 11:35	12/28/18 07:27	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	73.6		30 - 105	12/19/18 11:35	12/28/18 07:27	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	2.47	U	0.225	1.97	15.0	3.46	pCi/g	12/19/18 11:08	12/29/18 05:14	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.8*			*12/19/18 11:08*	*12/29/18 05:14*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Pu-242(T) (30-105)**							
300-8932-1	B3L2H6	94.4							
300-8932-1 DU	B3L2H6	85.7							
300-8932-2	B3L2H0	86.6							
300-8932-3	B3L2F9	86.4							
300-8932-4	B3L2F8	57.6							
300-8932-5	B3L2F1	81.4							
300-8932-6	B3L2F7	91.2							
300-8932-7	B3L2D7	86.8							
LCS 300-16807/2-A	Lab Control Sample	95.7							
MB 300-16807/1-A	Method Blank	93.0							

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**							
300-8932-1	B3L2H6	90.2							
300-8932-1 DU	B3L2H6	88.1							
300-8932-2	B3L2H0	86.3							
300-8932-3	B3L2F9	87.1							
300-8932-4	B3L2F8	83.6							
300-8932-5	B3L2F1	82.1							
300-8932-6	B3L2F7	88.4							
300-8932-7	B3L2D7	73.6							
LCS 300-16821/2-A	Lab Control Sample	80.8							
MB 300-16821/1-A	Method Blank	86.9							

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**							
300-8932-1	B3L2H6	94.4							
300-8932-2	B3L2H0	86.6							
300-8932-3	B3L2F9	86.4							
300-8932-4	B3L2F8	57.6							
300-8932-5	B3L2F1	81.4							
300-8932-6	B3L2F7	91.2							
300-8932-7	B3L2D7	86.8							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16796/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00126	U		0.0511	0.370	0.0534	pCi/g	12/18/18 16:59	12/26/18 08:37	1

Lab Sample ID: LCS 300-16796/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.478		0.195	0.370	0.111	pCi/g	95	80 - 120

Lab Sample ID: 300-8932-1 DU — **Client Sample ID: B3L2H6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0125	U	0.0302	U y	0.0832	0.370	0.0941	pCi/g	83	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16821/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17023 — **Prep Batch: 16821**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.000570	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-233/234	0.000	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-235/236	0.000	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.9*		*30 - 105*	*12/19/18 11:35*	*12/27/18 15:02*	*1*

Lab Sample ID: LCS 300-16821/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17023 — **Prep Batch: 16821**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	2.88	2.737		0.578	1.00	0.0488	pCi/g	95	80 - 120
U-233/234	2.75	2.990		0.619	1.00	0.0488	pCi/g	109	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*80.8*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8932-1 DU — **Client Sample ID: B3L2H6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17023 — **Prep Batch: 16821**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0495	U		0.0519		0.0525	1.00	0.0476	pCi/g			5	30
U-233/234	0.0893			0.0779		0.0647	1.00	0.0476	pCi/g			14	30
U-235/236	0.000	U		0.0130	U y	0.0261	1.00	0.0476	pCi/g			200	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*88.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16807/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17008 — **Prep Batch: 16807**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00798	U	0.0310	0.0310	1.00	0.0832	pCi/g	12/19/18 09:05	12/27/18 12:05	1
Pu-239/240	-0.00123	U	0.0307	0.0307	1.00	0.0606	pCi/g	12/19/18 09:05	12/27/18 12:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*93.0*		*30 - 105*	*12/19/18 09:05*	*12/27/18 12:05*	*1*

Lab Sample ID: LCS 300-16807/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17008 — **Prep Batch: 16807**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.43	4.149		0.807	1.00	0.0584	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*95.7*		*30 - 105*

Lab Sample ID: 300-8932-1 DU — **Client Sample ID: B3L2H6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17008 — **Prep Batch: 16807**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0045	U		-0.0102	U y	0.0305	1.00	0.0865	pCi/g			78	30
Pu-239/240	-0.00056	U		-0.00240	U y	0.0301	1.00	0.0651	pCi/g			124	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*85.7*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17060 — **Prep Batch: 16817**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.711	U	0.178	1.74	15.0	3.09	pCi/g	12/19/18 11:08	12/28/18 19:27	1

Lab Sample ID: LCS 300-16817/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17060 — **Prep Batch: 16817**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			214	212.6		14.4	15.0	2.84	pCi/g	99	80 - 120		

Lab Sample ID: 300-8932-1 DU — **Client Sample ID: B3L2H6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17060 — **Prep Batch: 16817**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.49	U		1.343	U	1.58	15.0	2.86	pCi/g			10	30

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

General Chemistry

Analysis Batch: 16797

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8932-1	B3L2H6	Total/NA	Solid	Moisture	
300-8932-2	B3L2H0	Total/NA	Solid	Moisture	
300-8932-3	B3L2F9	Total/NA	Solid	Moisture	
300-8932-4	B3L2F8	Total/NA	Solid	Moisture	
300-8932-5	B3L2F1	Total/NA	Solid	Moisture	
300-8932-6	B3L2F7	Total/NA	Solid	Moisture	
300-8932-7	B3L2D7	Total/NA	Solid	Moisture	
300-8932-1 DU	B3L2H6	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16796

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8932-1	B3L2H6	Total/NA	Solid	Direct Addition	
300-8932-2	B3L2H0	Total/NA	Solid	Direct Addition	
300-8932-3	B3L2F9	Total/NA	Solid	Direct Addition	
300-8932-4	B3L2F8	Total/NA	Solid	Direct Addition	
300-8932-5	B3L2F1	Total/NA	Solid	Direct Addition	
300-8932-6	B3L2F7	Total/NA	Solid	Direct Addition	
300-8932-7	B3L2D7	Total/NA	Solid	Direct Addition	
MB 300-16796/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16796/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8932-1 DU	B3L2H6	Total/NA	Solid	Direct Addition	

Prep Batch: 16807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8932-1	B3L2H6	Total/NA	Solid	ExtChrAct	
300-8932-2	B3L2H0	Total/NA	Solid	ExtChrAct	
300-8932-3	B3L2F9	Total/NA	Solid	ExtChrAct	
300-8932-4	B3L2F8	Total/NA	Solid	ExtChrAct	
300-8932-5	B3L2F1	Total/NA	Solid	ExtChrAct	
300-8932-6	B3L2F7	Total/NA	Solid	ExtChrAct	
300-8932-7	B3L2D7	Total/NA	Solid	ExtChrAct	
MB 300-16807/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16807/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8932-1 DU	B3L2H6	Total/NA	Solid	ExtChrAct	

Prep Batch: 16817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8932-1	B3L2H6	Total/NA	Solid	ExtChr_LSC	
300-8932-2	B3L2H0	Total/NA	Solid	ExtChr_LSC	
300-8932-3	B3L2F9	Total/NA	Solid	ExtChr_LSC	
300-8932-4	B3L2F8	Total/NA	Solid	ExtChr_LSC	
300-8932-5	B3L2F1	Total/NA	Solid	ExtChr_LSC	
300-8932-6	B3L2F7	Total/NA	Solid	ExtChr_LSC	
300-8932-7	B3L2D7	Total/NA	Solid	ExtChr_LSC	
MB 300-16817/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16817/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8932-1 DU	B3L2H6	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Rad (Continued)

Prep Batch: 16821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8932-1	B3L2H6	Total/NA	Solid	ExtChrAct	
300-8932-2	B3L2H0	Total/NA	Solid	ExtChrAct	
300-8932-3	B3L2F9	Total/NA	Solid	ExtChrAct	
300-8932-4	B3L2F8	Total/NA	Solid	ExtChrAct	
300-8932-5	B3L2F1	Total/NA	Solid	ExtChrAct	
300-8932-6	B3L2F7	Total/NA	Solid	ExtChrAct	
300-8932-7	B3L2D7	Total/NA	Solid	ExtChrAct	
MB 300-16821/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16821/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8932-1 DU	B3L2H6	Total/NA	Solid	ExtChrAct	

Client Sample ID: B3L2H6

Lab Sample ID: 300-8932-1

Date Collected: 12/06/18 08:42
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	354.88 g	354.88 g	16968	12/26/18 09:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	17008	12/27/18 12:05	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.12 g	1.12 g	17023	12/27/18 15:02	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.13 g	1.13 g	17060	12/28/18 21:38	DJ	TAL RCH

Client Sample ID: B3L2H0

Lab Sample ID: 300-8932-2

Date Collected: 12/06/18 09:08
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	362.4 g	362.4 g	16968	12/26/18 09:29	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.16 g	1.16 g	17008	12/27/18 12:05	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.14 g	1.14 g	17023	12/27/18 15:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.16 g	1.16 g	17060	12/28/18 23:48	DJ	TAL RCH

Client Sample ID: B3L2F9

Lab Sample ID: 300-8932-3

Date Collected: 12/06/18 09:20
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	370.23 g	370.23 g	16968	12/26/18 09:30	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.2 g	1.2 g	17008	12/27/18 12:05	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.58 g	1.58 g	17023	12/27/18 15:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.2 g	1.2 g	17060	12/29/18 00:53	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Client Sample ID: B3L2F8

Lab Sample ID: 300-8932-4
Date Collected: 12/06/18 09:47
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	369.25 g	369.25 g	16968	12/26/18 10:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	17008	12/27/18 12:06	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	17023	12/27/18 15:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	17060	12/29/18 01:58	DJ	TAL RCH

Client Sample ID: B3L2F1

Lab Sample ID: 300-8932-5
Date Collected: 12/06/18 10:50
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	364.1 g	364.1 g	16968	12/26/18 10:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	17008	12/27/18 12:06	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	17023	12/27/18 15:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.07 g	1.07 g	17060	12/29/18 03:03	DJ	TAL RCH

Client Sample ID: B3L2F7

Lab Sample ID: 300-8932-6
Date Collected: 12/06/18 11:15
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	334.27 g	334.27 g	16968	12/26/18 10:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	17008	12/27/18 12:06	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	17023	12/28/18 07:27	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.26 g	1.26 g	17060	12/29/18 04:09	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Client Sample ID: B3L2D7

Date Collected: 12/06/18 11:50
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8932-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16796	12/18/18 16:59	TDA	TAL RCH
Total/NA	Analysis	901.1		1	363.03 g	363.03 g	16968	12/26/18 10:23	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16807	12/19/18 09:05	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.02 g	1.02 g	17008	12/27/18 12:06	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16821	12/19/18 11:35	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	17023	12/28/18 07:27	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16817	12/19/18 11:08	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.02 g	1.02 g	17060	12/29/18 05:14	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8932-1	B3L2H6	Solid	12/06/18 08:42	12/07/18 09:50
300-8932-2	B3L2H0	Solid	12/06/18 09:08	12/07/18 09:50
300-8932-3	B3L2F9	Solid	12/06/18 09:20	12/07/18 09:50
300-8932-4	B3L2F8	Solid	12/06/18 09:47	12/07/18 09:50
300-8932-5	B3L2F1	Solid	12/06/18 10:50	12/07/18 09:50
300-8932-6	B3L2F7	Solid	12/06/18 11:15	12/07/18 09:50
300-8932-7	B3L2D7	Solid	12/06/18 11:50	12/07/18 09:50

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-023	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC		REQUIRED TAT 15 Days
SAMPLING LOCATION RTL PA J-41	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
23L2H6	N/A	SOIL	DEC 0 6 2018	0842	✓	✓

8932

00-8932 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlie Burghart CB	DEC 0 7 2018 0950

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65578 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-017	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PA J-35	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2H0	N/A	SOIL	DEC 06 2018	0908	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 06 2018 1440	SSU-1	DEC 06 2018 1440
SSU-1	DEC 07 2018 0700	Jeff Lucas /CHPRC	DEC 07 2018 0700
Jeff Lucas /CHPRC	DEC 07 2018 0950	Charlette Burghers	DEC 07 2018 0950

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65572 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-016	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PA J-34	**PROJECT DESIGNATION** RTL Paved Areas - Rad		**SAF NO.** F18-048	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

9932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33L2F9	N/A	SOIL	DEC 0 6 2018	0920	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlette Burghard CB TARI	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65571 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-015	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PA J-33	**PROJECT DESIGNATION** RTL Paved Areas - Rad		**SAF NO.** F18-048	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
3L2F8	N/A	SOIL	DEC 06 2018	0947	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 06 2018 1440	SSU-1	DEC 06 2018 1440
SSU-1	DEC 07 2018 0700	Jeff Lucas /CHPRC	DEC 07 2018 0700
Jeff Lucas /CHPRC	DEC 07 2018 0950	Cherette Burghes	DEC 07 2018 0950

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 **FSR ID = FSR65570** **TRVL NUM = TRVL-18-169** A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-008	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PA-8	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33L2F1	N/A	SOIL	DEC 0 6 2018	1050	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlotte Burgfeld	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65563 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-014	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL PA-14	**PROJECT DESIGNATION** RTL Paved Areas - Rad		**SAF NO.** F18-048	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N-50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2F7	N/A	SOIL	DEC 06 2018	1115	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 06 2018 1440	SSU-1	DEC 06 2018 1440
SSU-1	DEC 07 2018 0700	Jeff Lucas /CHPRC	DEC 07 2018 0700
Jeff Lucas /CHPRC	DEC 07 2018 0950	Charlette Burghod CB TARL	DEC 07 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65569 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-048-004	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL PA-4	PROJECT DESIGNATION RTL Paved Areas - Rad		SAF NO. F18-048	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 50736	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8932

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
33L2D7	N/A	SOIL	DEC 06 2018	1150	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 06 2018 1440	SSU-1	DEC 06 2018 1440
SSU-1	DEC 07 2018 0700	Jeff Lucas /CHPRC	DEC 07 2018 0700
Jeff Lucas /CHPRC	DEC 07 2018 0950	Charlette Burglund TAIL	DEC 07 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-169
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65559 TRVL NUM = TRVL-18-169 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8932-1
SDG Number: RL8932-1

Login Number: 8932
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8931-1
TestAmerica Sample Delivery Group: RL8931-1
Client Project/Site: F18-050

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/31/2018 12:11:12 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Have a Question? Ask The Expert

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8931-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8931-1

Comments
No additional comments.

Receipt
The samples were received on 12/7/2018 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Client Sample ID: B3L2X3
Date Collected: 12/06/18 10:17
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-1
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0296	U		0.0623	0.370	0.0776	pCi/g	12/18/18 16:52	12/24/18 12:14	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0024	U	0.0198	0.0198	1.00	0.0458	pCi/g	12/19/18 09:03	12/28/18 11:30	1
Pu-239/240	-0.0032	U	0.0198	0.0198	1.00	0.0483	pCi/g	12/19/18 09:03	12/28/18 11:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.6*		*30 - 105*	*12/19/18 09:03*	*12/28/18 11:30*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.104	U	0.0890	0.0905	1.00	0.118	pCi/g	12/19/18 11:34	12/26/18 08:19	1
U-233/234	0.0716	U	0.0687	0.0697	1.00	0.0860	pCi/g	12/19/18 11:34	12/26/18 08:19	1
U-235/236	0.0123	U	0.0281	0.0281	1.00	0.0582	pCi/g	12/19/18 11:34	12/26/18 08:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.3*		*30 - 105*	*12/19/18 11:34*	*12/26/18 08:19*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.801	U	0.0924	1.14	15.0	2.07	pCi/g	12/19/18 11:06	12/29/18 02:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.6*			*12/19/18 11:06*	*12/29/18 02:02*	*1*

Client Sample ID: B3L2X4
Date Collected: 12/06/18 12:10
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0255	U		0.0797	0.370	0.0916	pCi/g	12/18/18 16:52	12/24/18 13:07	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0178	U	0.0371	0.0372	1.00	0.0680	pCi/g	12/19/18 09:03	12/27/18 12:03	1
Pu-239/240	-0.0022	U	0.0371	0.0371	1.00	0.0770	pCi/g	12/19/18 09:03	12/27/18 12:03	1

Client Sample ID: B3L2X4
Lab Sample ID: 300-8931-2
Date Collected: 12/06/18 12:10
Matrix: Solid
Date Received: 12/07/18 09:50

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	91.7		30 - 105	12/19/18 09:03	12/27/18 12:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0305	U	0.0457	0.0459	1.00	0.0758	pCi/g	12/19/18 11:34	12/26/18 08:19	1
U-233/234	**0.0657**		0.0587	0.0596	1.00	0.0482	pCi/g	12/19/18 11:34	12/26/18 08:19	1
U-235/236	0.0126	U	0.0263	0.0264	1.00	0.0482	pCi/g	12/19/18 11:34	12/26/18 08:19	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	98.5		30 - 105	12/19/18 11:34	12/26/18 08:19	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.238	U	0.112	1.73	15.0	3.27	pCi/g	12/19/18 11:06	12/29/18 04:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	91.7			12/19/18 11:06	12/29/18 04:06	1

Client Sample ID: B3L2W7
Lab Sample ID: 300-8931-3
Date Collected: 12/06/18 12:10
Matrix: Solid
Date Received: 12/07/18 09:50

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0173	U		0.0895	0.370	0.0962	pCi/g	12/18/18 16:52	12/24/18 13:07	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0066	U	0.0301	0.0302	1.00	0.0787	pCi/g	12/19/18 09:03	12/27/18 12:03	1
Pu-239/240	-0.0012	U	0.0299	0.0299	1.00	0.0595	pCi/g	12/19/18 09:03	12/27/18 12:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	101		30 - 105	12/19/18 09:03	12/27/18 12:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.156**		0.0941	0.0971	1.00	0.0735	pCi/g	12/19/18 11:34	12/26/18 08:20	1
U-233/234	**0.107**		0.0768	0.0785	1.00	0.0565	pCi/g	12/19/18 11:34	12/26/18 08:20	1
U-235/236	-0.0027	U	0.0272	0.0273	1.00	0.0611	pCi/g	12/19/18 11:34	12/26/18 08:20	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	91.4		30 - 105	12/19/18 11:34	12/26/18 08:20	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.248	U	0.163	1.57	15.0	2.94	pCi/g	12/19/18 11:06	12/29/18 05:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*101*			*12/19/18 11:06*	*12/29/18 05:08*	*1*

Client Sample ID: B3L2W1
Lab Sample ID: 300-8931-4

Date Collected: 12/06/18 12:50
Matrix: Solid
Date Received: 12/07/18 09:50

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00713	U		0.0969	0.370	0.0936	pCi/g	12/18/18 16:52	12/26/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0019	U	0.0244	0.0244	1.00	0.0528	pCi/g	12/19/18 09:03	12/27/18 12:04	1
Pu-239/240	-0.00049	U	0.0243	0.0243	1.00	0.0446	pCi/g	12/19/18 09:03	12/27/18 12:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.7*		*30 - 105*	*12/19/18 09:03*	*12/27/18 12:04*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.260**		0.118	0.125	1.00	0.0630	pCi/g	12/19/18 11:34	12/26/18 08:21	1
U-233/234	**0.250**		0.115	0.121	1.00	0.0521	pCi/g	12/19/18 11:34	12/26/18 08:21	1
U-235/236	**0.0522**		0.0528	0.0534	1.00	0.0484	pCi/g	12/19/18 11:34	12/26/18 08:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.2*		*30 - 105*	*12/19/18 11:34*	*12/26/18 08:21*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.208	U	0.109	1.30	15.0	2.44	pCi/g	12/19/18 11:06	12/29/18 06:10	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.7*			*12/19/18 11:06*	*12/29/18 06:10*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Client Sample ID: B3L2W3
Date Collected: 12/06/18 13:00
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0674	U		0.0664	0.370	0.103	pCi/g	12/18/18 16:52	12/26/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0023	U	0.0386	0.0386	1.00	0.0801	pCi/g	12/19/18 09:03	12/27/18 12:04	1
Pu-239/240	-0.0015	U	0.0385	0.0385	1.00	0.0760	pCi/g	12/19/18 09:03	12/27/18 12:04	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*74.4*		*30 - 105*	*12/19/18 09:03*	*12/27/18 12:04*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.148**		0.105	0.108	1.00	0.0967	pCi/g	12/19/18 11:34	12/26/18 08:21	1
U-233/234	**0.117**		0.0930	0.0950	1.00	0.0880	pCi/g	12/19/18 11:34	12/26/18 08:21	1
U-235/236	0.0140	U	0.0352	0.0353	1.00	0.0790	pCi/g	12/19/18 11:34	12/26/18 08:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*61.8*		*30 - 105*	*12/19/18 11:34*	*12/26/18 08:21*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.81	U	0.188	2.10	15.0	4.08	pCi/g	12/19/18 11:06	12/29/18 07:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*74.4*			*12/19/18 11:06*	*12/29/18 07:12*	*1*

Client Sample ID: B3L2W6
Date Collected: 12/06/18 13:20
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.14	U		0.143	0.370	0.0733	pCi/g	12/18/18 16:52	12/26/18 08:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0016	U	0.0267	0.0267	1.00	0.0554	pCi/g	12/19/18 09:03	12/27/18 12:04	1
Pu-239/240	0.000	U	0.0266	0.0266	1.00	0.0488	pCi/g	12/19/18 09:03	12/27/18 12:04	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Client Sample ID: B3L2W6
Date Collected: 12/06/18 13:20
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-6
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	99.5		30 - 105	12/19/18 09:03	12/27/18 12:04	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.328		0.125	0.136	1.00	0.0837	pCi/g	12/19/18 11:34	12/26/18 08:22	1
U-233/234	0.451		0.144	0.161	1.00	0.0683	pCi/g	12/19/18 11:34	12/26/18 08:22	1
U-235/236	0.00808	U	0.0226	0.0226	1.00	0.0536	pCi/g	12/19/18 11:34	12/26/18 08:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	79.2		30 - 105	12/19/18 11:34	12/26/18 08:22	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.65	U	0.0798	1.40	15.0	2.73	pCi/g	12/19/18 11:06	12/29/18 08:14	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	99.5			12/19/18 11:06	12/29/18 08:14	1

Client Sample ID: B3L2X2
Date Collected: 12/06/18 13:42
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0515	U		0.0826	0.370	0.104	pCi/g	12/18/18 16:52	12/26/18 08:37	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0042	U	0.0233	0.0234	1.00	0.0608	pCi/g	12/19/18 09:03	12/27/18 12:04	1
Pu-239/240	0.000	U	0.0232	0.0232	1.00	0.0445	pCi/g	12/19/18 09:03	12/27/18 12:04	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	105		30 - 105	12/19/18 09:03	12/27/18 12:04	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0244	U	0.0531	0.0533	1.00	0.105	pCi/g	12/19/18 11:34	12/26/18 08:22	1
U-233/234	0.0244	U	0.0531	0.0533	1.00	0.105	pCi/g	12/19/18 11:34	12/26/18 08:22	1
U-235/236	-0.0011	U	0.0531	0.0531	1.00	0.0973	pCi/g	12/19/18 11:34	12/26/18 08:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	42.9		30 - 105	12/19/18 11:34	12/26/18 08:22	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.567	U	0.106	1.39	15.0	2.57	pCi/g	12/19/18 11:06	12/29/18 09:16	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*12/19/18 11:06*	*12/29/18 09:16*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8931-1	B3L2X3	95.6
300-8931-1 DU	B3L2X3	98.2
300-8931-2	B3L2X4	91.7
300-8931-3	B3L2W7	101
300-8931-4	B3L2W1	95.7
300-8931-5	B3L2W3	74.4
300-8931-6	B3L2W6	99.5
300-8931-7	B3L2X2	105
LCS 300-16806/2-A	Lab Control Sample	104
MB 300-16806/1-A	Method Blank	99.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8931-1	B3L2X3	80.3
300-8931-1 DU	B3L2X3	85.3
300-8931-2	B3L2X4	98.5
300-8931-3	B3L2W7	91.4
300-8931-4	B3L2W1	81.2
300-8931-5	B3L2W3	61.8
300-8931-6	B3L2W6	79.2
300-8931-7	B3L2X2	42.9
LCS 300-16820/2-A	Lab Control Sample	89.5
MB 300-16820/1-A	Method Blank	86.3

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8931-1	B3L2X3	95.6
300-8931-1 DU	B3L2X3	107
300-8931-2	B3L2X4	91.7
300-8931-3	B3L2W7	101
300-8931-4	B3L2W1	95.7
300-8931-5	B3L2W3	74.4
300-8931-6	B3L2W6	99.5
300-8931-7	B3L2X2	105
LCS 300-16816/2-A	Lab Control Sample	104
MB 300-16816/1-A	Method Blank	99.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16795/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0510	U		0.0286	0.370	0.0517	pCi/g	12/18/18 16:52	12/24/18 13:06	1

Lab Sample ID: LCS 300-16795/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.315		0.183	0.370	0.105	pCi/g	88	80 - 120

Lab Sample ID: 300-8931-1 DU — **Client Sample ID: B3L2X3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0296	U	-0.0268	U y	0.0900	0.370	0.0641	pCi/g	3958	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16820/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16967 — **Prep Batch: 16820**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.00889	U	0.0263	0.0264	1.00	0.0641	pCi/g	12/19/18 11:34	12/26/18 08:18	1
U-233/234	0.0340	U	0.0454	0.0457	1.00	0.0670	pCi/g	12/19/18 11:34	12/26/18 08:18	1
U-235/236	-0.000524	U	0.0262	0.0262	1.00	0.0480	pCi/g	12/19/18 11:34	12/26/18 08:18	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.3*		*30 - 105*	*12/19/18 11:34*	*12/26/18 08:18*	*1*

Lab Sample ID: LCS 300-16820/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16967 — **Prep Batch: 16820**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.13	3.144		0.625	1.00	0.0680	pCi/g	100	80 - 120
U-233/234	2.99	2.997		0.601	1.00	0.0583	pCi/g	100	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*89.5*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8931-1 DU — **Client Sample ID: B3L2X3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16967 — **Prep Batch: 16820**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.104	U		0.0501	U y	0.0517	1.00	0.0504	pCi/g			70	30
U-233/234	0.0716	U		0.110	y	0.0786	1.00	0.0654	pCi/g			42	30
U-235/236	0.0123	U		-0.000511	U y	0.0256	1.00	0.0469	pCi/g			217	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*85.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16806/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17009 — **Prep Batch: 16806**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0142	U	0.0338	0.0339	1.00	0.0732	pCi/g	12/19/18 09:03	12/27/18 12:02	1
Pu-239/240	-0.00405	U	0.0339	0.0339	1.00	0.0783	pCi/g	12/19/18 09:03	12/27/18 12:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.5*		*30 - 105*	*12/19/18 09:03*	*12/27/18 12:02*	*1*

Lab Sample ID: LCS 300-16806/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17009 — **Prep Batch: 16806**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.89	4.054		0.827	1.00	0.0837	pCi/g	83	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*104*		*30 - 105*

Lab Sample ID: 300-8931-1 DU — **Client Sample ID: B3L2X3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17009 — **Prep Batch: 16806**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0024	U		-0.000665	U y	0.0333	1.00	0.0610	pCi/g			112	30
Pu-239/240	-0.0032	U		-0.00199	U y	0.0333	1.00	0.0692	pCi/g			45	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*98.2*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16816/1-A
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16816

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.0411	U	0.0845	1.59	15.0	3.03	pCi/g	12/19/18 11:06	12/28/18 23:57	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.5*			*12/19/18 11:06*	*12/28/18 23:57*	*1*

Lab Sample ID: LCS 300-16816/2-A
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16816

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			235	213.7		14.3	15.0	3.05	pCi/g	91	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*104*		

Lab Sample ID: 300-8931-1 DU
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: B3L2X3
Prep Type: Total/NA
Prep Batch: 16816

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.801	U		0.0987	U y	1.54	15.0	2.94	pCi/g			156	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*107*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

General Chemistry

Analysis Batch: 16797

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8931-1	B3L2X3	Total/NA	Solid	Moisture	
300-8931-2	B3L2X4	Total/NA	Solid	Moisture	
300-8931-3	B3L2W7	Total/NA	Solid	Moisture	
300-8931-4	B3L2W1	Total/NA	Solid	Moisture	
300-8931-5	B3L2W3	Total/NA	Solid	Moisture	
300-8931-6	B3L2W6	Total/NA	Solid	Moisture	
300-8931-7	B3L2X2	Total/NA	Solid	Moisture	
300-8931-1 DU	B3L2X3	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16795

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8931-1	B3L2X3	Total/NA	Solid	Direct Addition	
300-8931-2	B3L2X4	Total/NA	Solid	Direct Addition	
300-8931-3	B3L2W7	Total/NA	Solid	Direct Addition	
300-8931-4	B3L2W1	Total/NA	Solid	Direct Addition	
300-8931-5	B3L2W3	Total/NA	Solid	Direct Addition	
300-8931-6	B3L2W6	Total/NA	Solid	Direct Addition	
300-8931-7	B3L2X2	Total/NA	Solid	Direct Addition	
MB 300-16795/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16795/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8931-1 DU	B3L2X3	Total/NA	Solid	Direct Addition	

Prep Batch: 16806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8931-1	B3L2X3	Total/NA	Solid	ExtChrAct	
300-8931-2	B3L2X4	Total/NA	Solid	ExtChrAct	
300-8931-3	B3L2W7	Total/NA	Solid	ExtChrAct	
300-8931-4	B3L2W1	Total/NA	Solid	ExtChrAct	
300-8931-5	B3L2W3	Total/NA	Solid	ExtChrAct	
300-8931-6	B3L2W6	Total/NA	Solid	ExtChrAct	
300-8931-7	B3L2X2	Total/NA	Solid	ExtChrAct	
MB 300-16806/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16806/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8931-1 DU	B3L2X3	Total/NA	Solid	ExtChrAct	

Prep Batch: 16816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8931-1	B3L2X3	Total/NA	Solid	ExtChr_LSC	
300-8931-2	B3L2X4	Total/NA	Solid	ExtChr_LSC	
300-8931-3	B3L2W7	Total/NA	Solid	ExtChr_LSC	
300-8931-4	B3L2W1	Total/NA	Solid	ExtChr_LSC	
300-8931-5	B3L2W3	Total/NA	Solid	ExtChr_LSC	
300-8931-6	B3L2W6	Total/NA	Solid	ExtChr_LSC	
300-8931-7	B3L2X2	Total/NA	Solid	ExtChr_LSC	
MB 300-16816/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16816/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8931-1 DU	B3L2X3	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Rad (Continued)

Prep Batch: 16820

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8931-1	B3L2X3	Total/NA	Solid	ExtChrAct	
300-8931-2	B3L2X4	Total/NA	Solid	ExtChrAct	
300-8931-3	B3L2W7	Total/NA	Solid	ExtChrAct	
300-8931-4	B3L2W1	Total/NA	Solid	ExtChrAct	
300-8931-5	B3L2W3	Total/NA	Solid	ExtChrAct	
300-8931-6	B3L2W6	Total/NA	Solid	ExtChrAct	
300-8931-7	B3L2X2	Total/NA	Solid	ExtChrAct	
MB 300-16820/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16820/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8931-1 DU	B3L2X3	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Client Sample ID: B3L2X3

Lab Sample ID: 300-8931-1
Date Collected: 12/06/18 10:17
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	358.58 g	358.58 g	16957	12/24/18 12:14	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	16967	12/26/18 08:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.5 g	1.5 g	17009	12/28/18 11:30	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.5 g	1.5 g	17048	12/29/18 02:02	DJ	TAL RCH

Client Sample ID: B3L2X4

Lab Sample ID: 300-8931-2
Date Collected: 12/06/18 12:10
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	352.28 g	352.28 g	16957	12/24/18 13:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16967	12/26/18 08:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	17009	12/27/18 12:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.99 g	0.99 g	17048	12/29/18 04:06	DJ	TAL RCH

Client Sample ID: B3L2W7

Lab Sample ID: 300-8931-3
Date Collected: 12/06/18 12:10
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	326.04 g	326.04 g	16957	12/24/18 13:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.98 g	0.98 g	16967	12/26/18 08:20	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	17009	12/27/18 12:03	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	17048	12/29/18 05:08	DJ	TAL RCH

Client Sample ID: B3L2W1

Lab Sample ID: 300-8931-4

Date Collected: 12/06/18 12:50
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	284.37 g	284.37 g	16957	12/26/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16967	12/26/18 08:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	17009	12/27/18 12:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.27 g	1.27 g	17048	12/29/18 06:10	DJ	TAL RCH

Client Sample ID: B3L2W3

Lab Sample ID: 300-8931-5

Date Collected: 12/06/18 13:00
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	286.96 g	286.96 g	16957	12/26/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16967	12/26/18 08:21	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.98 g	0.98 g	17009	12/27/18 12:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.98 g	0.98 g	17048	12/29/18 07:12	DJ	TAL RCH

Client Sample ID: B3L2W6

Lab Sample ID: 300-8931-6

Date Collected: 12/06/18 13:20
Matrix: Solid
Date Received: 12/07/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	257.47 g	257.47 g	16957	12/26/18 08:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.54 g	1.54 g	16967	12/26/18 08:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	17009	12/27/18 12:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.09 g	1.09 g	17048	12/29/18 08:14	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Client Sample ID: B3L2X2

Date Collected: 12/06/18 13:42
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8931-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16797	12/18/18 17:29	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16795	12/18/18 16:52	TDA	TAL RCH
Total/NA	Analysis	901.1		1	323.42 g	323.42 g	16957	12/26/18 08:37	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16820	12/19/18 11:34	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	16967	12/26/18 08:22	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16806	12/19/18 09:03	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	17009	12/27/18 12:04	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16816	12/19/18 11:06	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.15 g	1.15 g	17048	12/29/18 09:16	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8931-1	B3L2X3	Solid	12/06/18 10:17	12/07/18 09:50
300-8931-2	B3L2X4	Solid	12/06/18 12:10	12/07/18 09:50
300-8931-3	B3L2W7	Solid	12/06/18 12:10	12/07/18 09:50
300-8931-4	B3L2W1	Solid	12/06/18 12:50	12/07/18 09:50
300-8931-5	B3L2W3	Solid	12/06/18 13:00	12/07/18 09:50
300-8931-6	B3L2W6	Solid	12/06/18 13:20	12/07/18 09:50
300-8931-7	B3L2X2	Solid	12/06/18 13:42	12/07/18 09:50

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-015	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL OA J-42	**PROJECT DESIGNATION** RTL Open Areas - Rad		**SAF NO.** F18-050	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 50736	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X3	N/A	SOIL	DEC 06 2018	1017	✓	✓

RL8931-1

300-8931 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 06 2018 1440	SSU-1	DEC 06 2018 1440
SSU-1	DEC 07 2018 0700	Jeff Lucas /CHPRC	DEC 07 2018 0700
Jeff Lucas /CHPRC	DEC 07 2018 0950	Charlette Buglard TAPE	DEC 07 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65604 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-016	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA DUP1	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X4	N/A	SOIL	DEC 0 6 2018	1210	✓	✓

RL8931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson ~~Waste/CHPRC~~ CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlette Bugher	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65605 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-009	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-9	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 527 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W7	N/A	SOIL	DEC 0 6 2018	1210	✓	✓

RL8931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Cherlette Burghed	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65598 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-003	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL OA-3	**PROJECT DESIGNATION** RTL Open Areas - Rad		**SAF NO.** F18-050	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W1	N/A	SOIL	DEC 0 6 2018	1250	✓	✓

RL8931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlotte Bingham	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65592 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-005	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-5	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W3	N/A	SOIL	DEC 0 6 2018	1300	✓	✓

RL5931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlette Burghard TAPL	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65594 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-008	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-8	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W6	N/A	SOIL	DEC 0 6 2018	1320	✓	✓

RL5931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlotte Bryant CB	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65597 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-014	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC	**REQUIRED TAT** 15 Days	
SAMPLING LOCATION RTL OA-14	**PROJECT DESIGNATION** RTL Open Areas - Rad		**SAF NO.** F18-050	ORIGINAL	
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 567 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X2	N/A	SOIL	DEC 0 6 2018	1342	✓	✓

RL8931-1

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CHPRC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlette Burgwald CB TAKE	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65603 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8931-1
SDG Number: RL8931-1

Login Number: 8931
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8944-1
TestAmerica Sample Delivery Group: RL8944-1
Client Project/Site: F18-050

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/31/2018 1:26:05 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8944-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8944-1

Comments
No additional comments.

Receipt
The samples were received on 12/10/2018 10:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method(s) ST-RC-0245: The laboratory control sample (LCS) associated with preparation batch 300-16902 and analytical batch 300-17058 was outside SOW acceptance criteria but within QSM criteria. For more information see the attached SIR.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0380
Rev. Number: 0
Date Initiated: 12/31/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-050

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 10

SAMPLE NUMBERS: B3L2V9, B3L2W0, B3L2W2, B3L2W4, B3L2W5, B3L2W8, B3L2W9, B3L2X0, B3L2X1, B3L2X5

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8944-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for PU241 is outside acceptance criteria at 122%, but within QSM limits. Sample results are a non-detect.

RESOLUTION

PROPOSED RESOLUTION: Please narrate and report results.

FINAL RESOLUTION: See the Proposed Resolution.

SUBMITTED BY:

WORTHY, A 12/31/2018

ACCEPTED BY:

CUTSFORTH, EC 12/31/2018

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2W9

Lab Sample ID: 300-8944-1
Date Collected: 12/07/18 07:42
Matrix: Solid
Date Received: 12/10/18 10:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0133	U		0.0990	0.370	0.0991	pCi/g	12/19/18 14:26	12/26/18 11:15	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00949	U	0.0227	0.0227	1.00	0.0501	pCi/g	12/21/18 08:52	12/27/18 14:06	1
Pu-239/240	0.0108	U	0.0226	0.0227	1.00	0.0424	pCi/g	12/21/18 08:52	12/27/18 14:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*102*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0778**		0.0677	0.0687	1.00	0.0692	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-233/234	**0.0955**		0.0730	0.0745	1.00	0.0545	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-235/236	0.0116	U	0.0277	0.0277	1.00	0.0599	pCi/g	12/21/18 11:09	12/27/18 15:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.7*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:00*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.93	U o	0.109	1.32	15.0	2.68	pCi/g	12/21/18 09:59	12/29/18 09:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*102*			*12/21/18 09:59*	*12/29/18 09:35*	*1*

Client Sample ID: B3L2X0

Lab Sample ID: 300-8944-2
Date Collected: 12/07/18 08:08
Matrix: Solid
Date Received: 12/10/18 10:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.025	U		0.123	0.370	0.102	pCi/g	12/19/18 14:26	12/26/18 11:16	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0018	U	0.0294	0.0294	1.00	0.0611	pCi/g	12/21/18 08:52	12/27/18 14:07	1
Pu-239/240	0.000	U	0.0294	0.0294	1.00	0.0539	pCi/g	12/21/18 08:52	12/27/18 14:07	1

Client Sample ID: B3L2X0
Lab Sample ID: 300-8944-2
Date Collected: 12/07/18 08:08
Matrix: Solid
Date Received: 12/10/18 10:25

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	92.8		30 - 105	12/21/18 08:52	12/27/18 14:07	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0832		0.0630	0.0643	1.00	0.0603	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	0.137		0.0803	0.0830	1.00	0.0632	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	0.00934	U	0.0223	0.0224	1.00	0.0483	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	83.9		30 - 105	12/21/18 11:09	12/27/18 15:01	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.393	U o	0.103	1.76	15.0	3.39	pCi/g	12/21/18 09:59	12/29/18 11:45	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	92.8			12/21/18 09:59	12/29/18 11:45	1

Client Sample ID: B3L2X5
Lab Sample ID: 300-8944-3
Date Collected: 12/07/18 08:08
Matrix: Solid
Date Received: 12/10/18 10:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0536	U		0.0842	0.370	0.113	pCi/g	12/19/18 14:26	12/26/18 11:16	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0052	U	0.0328	0.0328	1.00	0.0798	pCi/g	12/21/18 08:52	12/27/18 14:07	1
Pu-239/240	0.000	U	0.0326	0.0326	1.00	0.0598	pCi/g	12/21/18 08:52	12/27/18 14:07	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	86.5		30 - 105	12/21/18 08:52	12/27/18 14:07	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.192		0.113	0.117	1.00	0.111	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	0.140		0.0925	0.0951	1.00	0.0748	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.0035	U	0.0294	0.0294	1.00	0.0679	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	88.5		30 - 105	12/21/18 11:09	12/27/18 15:01	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-1.5	U o	0.162	1.89	15.0	3.87	pCi/g	12/21/18 09:59	12/29/18 12:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*86.5*			*12/21/18 09:59*	*12/29/18 12:50*	*1*

Client Sample ID: B3L2W8
Lab Sample ID: 300-8944-4

Date Collected: 12/07/18 08:30
Matrix: Solid
Date Received: 12/10/18 10:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0720	U		0.0778	0.370	0.122	pCi/g	12/19/18 14:26	12/26/18 12:08	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0070	U	0.0295	0.0295	1.00	0.0778	pCi/g	12/21/18 08:52	12/27/18 14:07	1
Pu-239/240	0.0134	U	0.0293	0.0293	1.00	0.0577	pCi/g	12/21/18 08:52	12/27/18 14:07	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*79.8*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:07*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.332**		0.101	0.112	1.00	0.0286	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	**0.355**		0.105	0.117	1.00	0.0286	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.00031	U	0.0154	0.0154	1.00	0.0286	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*101*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:01*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.775	U o	0.0801	1.81	15.0	3.44	pCi/g	12/21/18 09:59	12/29/18 13:55	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*79.8*			*12/21/18 09:59*	*12/29/18 13:55*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2W2
Date Collected: 12/07/18 10:40
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-5
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.038	U		0.123	0.370	0.105	pCi/g	12/19/18 14:26	12/26/18 12:08	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0043	U	0.0270	0.0270	1.00	0.0658	pCi/g	12/21/18 08:52	12/27/18 14:07	1
Pu-239/240	-0.0016	U	0.0269	0.0269	1.00	0.0559	pCi/g	12/21/18 08:52	12/27/18 14:07	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.6*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:07*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.228**		0.102	0.108	1.00	0.0418	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	**0.181**		0.0912	0.0953	1.00	0.0474	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.00091	U	0.0228	0.0228	1.00	0.0450	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*96.4*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:01*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.43	U o	0.0878	1.56	15.0	3.08	pCi/g	12/21/18 09:59	12/29/18 15:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.6*			*12/21/18 09:59*	*12/29/18 15:01*	*1*

Client Sample ID: B3L2W0
Date Collected: 12/07/18 10:20
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-6
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.033	U		0.126	0.370	0.113	pCi/g	12/19/18 14:26	12/26/18 12:09	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0133	U	0.0394	0.0395	1.00	0.0959	pCi/g	12/21/18 08:52	12/27/18 14:07	1
Pu-239/240	-0.0016	U	0.0392	0.0392	1.00	0.0773	pCi/g	12/21/18 08:52	12/27/18 14:07	1

Client Sample ID: B3L2W0
Date Collected: 12/07/18 10:20
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-6
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	75.4		30 - 105	12/21/18 08:52	12/27/18 14:07	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.294		0.125	0.134	1.00	0.0491	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	0.307		0.128	0.138	1.00	0.0491	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.00053	U	0.0268	0.0268	1.00	0.0491	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	72.1		30 - 105	12/21/18 11:09	12/27/18 15:01	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.21	U o	0.122	2.30	15.0	4.35	pCi/g	12/21/18 09:59	12/29/18 16:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	75.4			12/21/18 09:59	12/29/18 16:06	1

Client Sample ID: B3L2V9
Date Collected: 12/07/18 09:57
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-7
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.055	U		0.134	0.370	0.114	pCi/g	12/19/18 14:26	12/26/18 12:09	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0071	U	0.0277	0.0277	1.00	0.0742	pCi/g	12/21/18 08:52	12/27/18 14:08	1
Pu-239/240	0.0115	U	0.0275	0.0275	1.00	0.0594	pCi/g	12/21/18 08:52	12/27/18 14:08	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	77.9		30 - 105	12/21/18 08:52	12/27/18 14:08	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.117		0.0743	0.0765	1.00	0.0431	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	0.175		0.0910	0.0950	1.00	0.0464	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.0023	U	0.0236	0.0236	1.00	0.0529	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	95.9		30 - 105	12/21/18 11:09	12/27/18 15:01	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.631	U o	0.182	1.75	15.0	3.30	pCi/g	12/21/18 09:59	12/29/18 17:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*77.9*			*12/21/18 09:59*	*12/29/18 17:11*	*1*

Client Sample ID: B3L2W5
Lab Sample ID: 300-8944-8

Date Collected: 12/07/18 09:44
Matrix: Solid
Date Received: 12/10/18 10:25

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.080	U		0.137	0.370	0.0898	pCi/g	12/19/18 14:26	12/26/18 12:09	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0273	U	0.0484	0.0486	1.00	0.0873	pCi/g	12/21/18 08:52	12/27/18 14:08	1
Pu-239/240	-0.0020	U	0.0342	0.0342	1.00	0.0709	pCi/g	12/21/18 08:52	12/27/18 14:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.4*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.146**		0.0929	0.0958	1.00	0.0539	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	**0.188**		0.106	0.110	1.00	0.0661	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	-0.00059	U	0.0294	0.0294	1.00	0.0539	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*79.5*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:01*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.0560	U o	0.0648	1.95	15.0	3.79	pCi/g	12/21/18 09:59	12/29/18 18:17	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.4*			*12/21/18 09:59*	*12/29/18 18:17*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2W4
Date Collected: 12/07/18 09:20
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-9
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0469	U		0.0925	0.370	0.110	pCi/g	12/19/18 14:26	12/27/18 07:36	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0335	U	0.0552	0.0555	1.00	0.0929	pCi/g	12/21/18 08:52	12/27/18 14:08	1
Pu-239/240	-0.00078	U	0.0389	0.0389	1.00	0.0714	pCi/g	12/21/18 08:52	12/27/18 14:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*60.2*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.240**		0.114	0.120	1.00	0.0491	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-233/234	**0.320**		0.131	0.140	1.00	0.0529	pCi/g	12/21/18 11:09	12/27/18 15:01	1
U-235/236	0.0128	U	0.0268	0.0269	1.00	0.0491	pCi/g	12/21/18 11:09	12/27/18 15:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.5*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:01*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.090	U o	0.0892	2.33	15.0	4.56	pCi/g	12/21/18 09:59	12/29/18 20:27	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*60.2*			*12/21/18 09:59*	*12/29/18 20:27*	*1*

Client Sample ID: B3L2X1
Date Collected: 12/07/18 08:57
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-10
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00745	U		0.115	0.370	0.115	pCi/g	12/19/18 14:26	12/27/18 07:39	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.010	U	0.0311	0.0312	1.00	0.0885	pCi/g	12/21/18 08:52	12/27/18 14:08	1
Pu-239/240	-0.0025	U	0.0308	0.0308	1.00	0.0666	pCi/g	12/21/18 08:52	12/27/18 14:08	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2X1

Date Collected: 12/07/18 08:57
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-10

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242(T)	92.3		30 - 105	12/21/18 08:52	12/27/18 14:08	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.337**		0.138	0.147	1.00	0.0516	pCi/g	12/21/18 11:09	12/27/18 15:02	1
U-233/234	**0.421**		0.154	0.167	1.00	0.0516	pCi/g	12/21/18 11:09	12/27/18 15:02	1
U-235/236	0.0118	U	0.0282	0.0283	1.00	0.0610	pCi/g	12/21/18 11:09	12/27/18 15:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
U-232(T)	86.8		30 - 105	12/21/18 11:09	12/27/18 15:02	1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.256	U o	0.128	1.86	15.0	3.61	pCi/g	12/21/18 09:59	12/29/18 21:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Pu-242 (T)	92.3			12/21/18 09:59	12/29/18 21:33	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**Pu-242(T) (30-105)**						
300-8944-1	B3L2W9	102						
300-8944-2	B3L2X0	92.8						
300-8944-3	B3L2X5	86.5						
300-8944-4	B3L2W8	79.8						
300-8944-5	B3L2W2	90.6						
300-8944-6	B3L2W0	75.4						
300-8944-7	B3L2V9	77.9						
300-8944-8	B3L2W5	83.4						
300-8944-9	B3L2W4	60.2						
300-8944-10	B3L2X1	92.3						
LCS 300-16888/2-A	Lab Control Sample	86.8						
MB 300-16888/1-A	Method Blank	45.9						

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**						
300-8944-1	B3L2W9	84.7						
300-8944-1 DU	B3L2W9	82.8						
300-8944-2	B3L2X0	83.9						
300-8944-3	B3L2X5	88.5						
300-8944-4	B3L2W8	101						
300-8944-5	B3L2W2	96.4						
300-8944-6	B3L2W0	72.1						
300-8944-7	B3L2V9	95.9						
300-8944-8	B3L2W5	79.5						
300-8944-9	B3L2W4	86.5						
300-8944-10	B3L2X1	86.8						
LCS 300-16908/2-B	Lab Control Sample	91.2						
MB 300-16908/1-A	Method Blank	77.6						

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**						
300-8944-1	B3L2W9	102						
300-8944-2	B3L2X0	92.8						
300-8944-3	B3L2X5	86.5						
300-8944-4	B3L2W8	79.8						
300-8944-5	B3L2W2	90.6						

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8944-6	B3L2W0	75.4							
300-8944-7	B3L2V9	77.9							
300-8944-8	B3L2W5	83.4							
300-8944-9	B3L2W4	60.2							
300-8944-10	B3L2X1	92.3							
LCS 300-16902/2-A	Lab Control Sample	86.8							
MB 300-16902/1-A	Method Blank	45.9							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16832/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0237	U		0.0748	0.370	0.0558	pCi/g	12/19/18 14:26	12/26/18 10:23	1

Lab Sample ID: LCS 300-16832/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.566		0.199	0.370	0.117	pCi/g	98	80 - 120		

Lab Sample ID: 300-8944-1 DU — **Client Sample ID: B3L2W9**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	0.0133	U		0.0591	U y	0.0299	0.370	0.0818	pCi/g			126	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16908/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17012 — **Prep Batch: 16908**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00562	U	0.0314	0.0314	1.00	0.0782	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-233/234	-0.00625	U	0.0315	0.0315	1.00	0.0799	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-235/236	0.0150	U	0.0312	0.0313	1.00	0.0573	pCi/g	12/21/18 11:09	12/27/18 15:00	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*77.6*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:00*	*1*

Lab Sample ID: LCS 300-16908/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17012 — **Prep Batch: 16908**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.46	3.130		0.629	1.00	0.0634	pCi/g	90	80 - 120		
U-233/234			3.31	3.327		0.660	1.00	0.0680	pCi/g	101	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*91.2*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8944-1 DU — **Client Sample ID: B3L2W9**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17012 — **Prep Batch: 16908**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0778			0.109	y	0.0727	1.00	0.0519	pCi/g			33	30
U-233/234	0.0955			0.110		0.0727	1.00	0.0465	pCi/g			15	30
U-235/236	0.0116	U		-0.000447	U y	0.0224	1.00	0.0410	pCi/g			216	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*82.8*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16888/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17011 — **Prep Batch: 16888**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00149	U	0.0747	0.0747	1.00	0.137	pCi/g	12/21/18 08:52	12/27/18 14:05	1
Pu-239/240	-0.00448	U	0.0749	0.0749	1.00	0.155	pCi/g	12/21/18 08:52	12/27/18 14:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*45.9*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:05*	*1*

Lab Sample ID: LCS 300-16888/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17011 — **Prep Batch: 16888**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.50	4.462		0.911	1.00	0.0653	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*86.8*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16902/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17058 — **Prep Batch: 16902**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	3.479	U	0.387	4.00	15.0	7.42	pCi/g	12/21/18 09:59	12/29/18 07:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*45.9*			*12/21/18 09:59*	*12/29/18 07:24*	*1*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Lab Sample ID: LCS 300-16902/2-A
Matrix: Solid
Analysis Batch: 17058

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16902

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			255	309.7	o	20.7	15.0	3.57	pCi/g	122	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*86.8*		

Lab Sample ID: 300-8944-1 DU
Matrix: Solid
Analysis Batch: 17058

Client Sample ID: B3L2W9
Prep Type: Total/NA
Prep Batch: 16902

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.93	U o		3.009	U o y	2.25	15.0	3.11	pCi/g			378	30

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

General Chemistry

Analysis Batch: 16878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-1	B3L2W9	Total/NA	Solid	Moisture	
300-8944-2	B3L2X0	Total/NA	Solid	Moisture	
300-8944-3	B3L2X5	Total/NA	Solid	Moisture	
300-8944-4	B3L2W8	Total/NA	Solid	Moisture	
300-8944-5	B3L2W2	Total/NA	Solid	Moisture	
300-8944-6	B3L2W0	Total/NA	Solid	Moisture	
300-8944-7	B3L2V9	Total/NA	Solid	Moisture	
300-8944-8	B3L2W5	Total/NA	Solid	Moisture	
300-8944-9	B3L2W4	Total/NA	Solid	Moisture	
300-8944-10	B3L2X1	Total/NA	Solid	Moisture	
300-8944-1 DU	B3L2W9	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-1	B3L2W9	Total/NA	Solid	Direct Addition	
300-8944-2	B3L2X0	Total/NA	Solid	Direct Addition	
300-8944-3	B3L2X5	Total/NA	Solid	Direct Addition	
300-8944-4	B3L2W8	Total/NA	Solid	Direct Addition	
300-8944-5	B3L2W2	Total/NA	Solid	Direct Addition	
300-8944-6	B3L2W0	Total/NA	Solid	Direct Addition	
300-8944-7	B3L2V9	Total/NA	Solid	Direct Addition	
300-8944-8	B3L2W5	Total/NA	Solid	Direct Addition	
300-8944-9	B3L2W4	Total/NA	Solid	Direct Addition	
300-8944-10	B3L2X1	Total/NA	Solid	Direct Addition	
MB 300-16832/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16832/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8944-1 DU	B3L2W9	Total/NA	Solid	Direct Addition	

Prep Batch: 16888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-1	B3L2W9	Total/NA	Solid	ExtChrAct	
300-8944-2	B3L2X0	Total/NA	Solid	ExtChrAct	
300-8944-3	B3L2X5	Total/NA	Solid	ExtChrAct	
300-8944-4	B3L2W8	Total/NA	Solid	ExtChrAct	
300-8944-5	B3L2W2	Total/NA	Solid	ExtChrAct	
300-8944-6	B3L2W0	Total/NA	Solid	ExtChrAct	
300-8944-7	B3L2V9	Total/NA	Solid	ExtChrAct	
300-8944-8	B3L2W5	Total/NA	Solid	ExtChrAct	
300-8944-9	B3L2W4	Total/NA	Solid	ExtChrAct	
300-8944-10	B3L2X1	Total/NA	Solid	ExtChrAct	
MB 300-16888/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16888/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	

Prep Batch: 16902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-1	B3L2W9	Total/NA	Solid	ExtChr_LSC	
300-8944-2	B3L2X0	Total/NA	Solid	ExtChr_LSC	
300-8944-3	B3L2X5	Total/NA	Solid	ExtChr_LSC	

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Rad (Continued)

Prep Batch: 16902 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-4	B3L2W8	Total/NA	Solid	ExtChr_LSC	
300-8944-5	B3L2W2	Total/NA	Solid	ExtChr_LSC	
300-8944-6	B3L2W0	Total/NA	Solid	ExtChr_LSC	
300-8944-7	B3L2V9	Total/NA	Solid	ExtChr_LSC	
300-8944-8	B3L2W5	Total/NA	Solid	ExtChr_LSC	
300-8944-9	B3L2W4	Total/NA	Solid	ExtChr_LSC	
300-8944-10	B3L2X1	Total/NA	Solid	ExtChr_LSC	
MB 300-16902/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16902/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8944-1 DU	B3L2W9	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8944-1	B3L2W9	Total/NA	Solid	ExtChrAct	
300-8944-2	B3L2X0	Total/NA	Solid	ExtChrAct	
300-8944-3	B3L2X5	Total/NA	Solid	ExtChrAct	
300-8944-4	B3L2W8	Total/NA	Solid	ExtChrAct	
300-8944-5	B3L2W2	Total/NA	Solid	ExtChrAct	
300-8944-6	B3L2W0	Total/NA	Solid	ExtChrAct	
300-8944-7	B3L2V9	Total/NA	Solid	ExtChrAct	
300-8944-8	B3L2W5	Total/NA	Solid	ExtChrAct	
300-8944-9	B3L2W4	Total/NA	Solid	ExtChrAct	
300-8944-10	B3L2X1	Total/NA	Solid	ExtChrAct	
MB 300-16908/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16908/2-B	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8944-1 DU	B3L2W9	Total/NA	Solid	ExtChrAct	

Client Sample ID: B3L2W9

Lab Sample ID: 300-8944-1

Date Collected: 12/07/18 07:42
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	332.63 g	332.63 g	16988	12/26/18 11:15	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.28 g	1.28 g	17011	12/27/18 14:06	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	17012	12/27/18 15:00	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.28 g	1.28 g	17058	12/29/18 09:35	DJ	TAL RCH

Client Sample ID: B3L2X0

Lab Sample ID: 300-8944-2

Date Collected: 12/07/18 08:08
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	302.57 g	302.57 g	16988	12/26/18 11:16	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	17011	12/27/18 14:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.29 g	1.29 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	17058	12/29/18 11:45	DJ	TAL RCH

Client Sample ID: B3L2X5

Lab Sample ID: 300-8944-3

Date Collected: 12/07/18 08:08
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	275.61 g	275.61 g	16988	12/26/18 11:16	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.99 g	0.99 g	17011	12/27/18 14:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.99 g	0.99 g	17058	12/29/18 12:50	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2W8

Lab Sample ID: 300-8944-4
Date Collected: 12/07/18 08:30
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	241.06 g	241.06 g	16988	12/26/18 12:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.2 g	1.2 g	17011	12/27/18 14:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.59 g	1.59 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.2 g	1.2 g	17058	12/29/18 13:55	DJ	TAL RCH

Client Sample ID: B3L2W2

Lab Sample ID: 300-8944-5
Date Collected: 12/07/18 10:40
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	305.25 g	305.25 g	16988	12/26/18 12:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	17011	12/27/18 14:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.18 g	1.18 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.18 g	1.18 g	17058	12/29/18 15:01	DJ	TAL RCH

Client Sample ID: B3L2W0

Lab Sample ID: 300-8944-6
Date Collected: 12/07/18 10:20
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	222.41 g	222.41 g	16988	12/26/18 12:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	17011	12/27/18 14:07	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.31 g	1.31 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.01 g	1.01 g	17058	12/29/18 16:06	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2V9

Lab Sample ID: 300-8944-7

Date Collected: 12/07/18 09:57
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	262.83 g	262.83 g	16988	12/26/18 12:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.29 g	1.29 g	17011	12/27/18 14:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.29 g	1.29 g	17058	12/29/18 17:11	DJ	TAL RCH

Client Sample ID: B3L2W5

Lab Sample ID: 300-8944-8

Date Collected: 12/07/18 09:44
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	268.83 g	268.83 g	16988	12/26/18 12:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	17011	12/27/18 14:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.04 g	1.04 g	17058	12/29/18 18:17	DJ	TAL RCH

Client Sample ID: B3L2W4

Lab Sample ID: 300-8944-9

Date Collected: 12/07/18 09:20
Matrix: Solid
Date Received: 12/10/18 10:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	257.97 g	257.97 g	16988	12/27/18 07:36	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.21 g	1.21 g	17011	12/27/18 14:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	17012	12/27/18 15:01	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.21 g	1.21 g	17058	12/29/18 20:27	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Client Sample ID: B3L2X1

Date Collected: 12/07/18 08:57
Date Received: 12/10/18 10:25

Lab Sample ID: 300-8944-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16832	12/19/18 14:26	TDA	TAL RCH
Total/NA	Analysis	901.1		1	233.13 g	233.13 g	16988	12/27/18 07:39	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16888	12/21/18 08:52	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	17011	12/27/18 14:08	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16908	12/21/18 11:09	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	17012	12/27/18 15:02	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16902	12/21/18 09:59	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1 g	1 g	17058	12/29/18 21:33	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8944-1	B3L2W9	Solid	12/07/18 07:42	12/10/18 10:25
300-8944-2	B3L2X0	Solid	12/07/18 08:08	12/10/18 10:25
300-8944-3	B3L2X5	Solid	12/07/18 08:08	12/10/18 10:25
300-8944-4	B3L2W8	Solid	12/07/18 08:30	12/10/18 10:25
300-8944-5	B3L2W2	Solid	12/07/18 10:40	12/10/18 10:25
300-8944-6	B3L2W0	Solid	12/07/18 10:20	12/10/18 10:25
300-8944-7	B3L2V9	Solid	12/07/18 09:57	12/10/18 10:25
300-8944-8	B3L2W5	Solid	12/07/18 09:44	12/10/18 10:25
300-8944-9	B3L2W4	Solid	12/07/18 09:20	12/10/18 10:25
300-8944-10	B3L2X1	Solid	12/07/18 08:57	12/10/18 10:25

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F18-050-011 PAGE 1 OF 1

COLLECTOR Malcom Chunn CHPRC	**COMPANY CONTACT** SUMNER, LC	**TELEPHONE NO.** 376-3922	**PROJECT COORDINATOR** SUMNER, LC
SAMPLING LOCATION RTL OA-11	**PROJECT DESIGNATION** RTL Open Areas - Rad		**SAF NO.** F18-050
ICE CHEST NO. N/A	**FIELD LOGBOOK NO.** HNF-N- 507 36	**ACTUAL SAMPLE DEPTH** 0"-6"	**PURCHASE ORDER/CHARGE CODE** 304708
SHIPPED TO TestAmerica Incorporated, Richland	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

REQUIRED TAT 15 Days

ORIGINAL

METHOD OF SHIPMENT GOVERNMENT VEHICLE

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W9	N/A	SOIL	DEC 07 2018	0742	✓	✓

8944

300-8944 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0510	Jeff Lucas /CHPRC	DEC 10 2018 0510
Jeff Lucas /CHPRC	DEC 10 2018 1025	Charlette Bugher TARL	DEC 10 2018 1025

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION | **DISPOSAL METHOD** | **DISPOSED BY** | **DATE/TIME**

PRINTED ON 11/15/2018

FSR ID = FSR65600

TRVL NUM = TRVL-18-170

A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-012	PAGE 1 OF 1
COLLECTOR: Malcom Chunn, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OA-12	PROJECT DESIGNATION: RTL Open Areas - Rad		SAF NO.: F18-050	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8944

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X0	N/A	SOIL	DEC 07 2018	0808	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025	Charlette Burghard TARL	DEC 10 2018 1025

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018

FSR ID = FSR65601

TRVL NUM = TRVL-18-170

A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-017	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA DUP2	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

8944

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X5	N/A	SOIL	DEC 0 7 2018	0808	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 0 7 2018 1200	SSU 1	DEC 0 7 2018 1200
SSU-1	DEC 1 0 2018 0810	Jeff Lucas /CHPRC	DEC 1 0 2018 0810
Jeff Lucas /CHPRC	DEC 1 0 2018 1025	Charlette Burghard TARL	DEC 1 0 2018 1025

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65606 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-010	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-10	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8944

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W8	N/A	SOIL	DEC 07 2018	0830	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU-1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025	Charlette Burgland TAIRL	DEC 10 2018 1025

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65599 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-004	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-4	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

8944

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W2	N/A	SOIL	DEC 07 2018	1040	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025		DEC 10 2018 1025

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65593 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-002	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL OA-2	PROJECT DESIGNATION: RTL Open Areas - Rad		SAF NO.: F18-050	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

8944

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W0	N/A	SOIL	DEC 07 2018	1020	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	DEC 07 2018 1200	SSU 1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025		DEC 10 2018 1025

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65591 TRVL NUM = TRVL-18-170

A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-001	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL OA-1	PROJECT DESIGNATION: RTL Open Areas - Rad		SAF NO.: F18-050	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

8944

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2V9	N/A	SOIL	DEC 07 2018	0957	✓	✓

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	DEC 07 2018 1200	SSU 1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025		DEC 10 2018 1025

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018

FSR ID = FSR65590

TRVL NUM = TRVL-18-170

A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-007	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL OA-7	PROJECT DESIGNATION: RTL Open Areas - Rad		SAF NO.: F18-050	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507-36	ACTUAL SAMPLE DEPTH: 0-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8944

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W5	N/A	SOIL	DEC 07 2018	0944	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025	SSU1	DEC 10 2018 1025

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 12/6/2018 FSR ID = FSR65596 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-006	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL OA-6	PROJECT DESIGNATION RTL Open Areas - Rad		SAF NO. F18-050	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N- 507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

B944

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2W4	N/A	SOIL	DEC 07 2018	0920	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025	SUITE TOUL	DEC 10 2018 1025

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65595 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-050-013	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL OA-13	PROJECT DESIGNATION: RTL Open Areas - Rad		SAF NO.: F18-050	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N- 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8944

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3L2X1	N/A	SOIL	DEC 07 2018	0857	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	DEC 07 2018 1200	SSU1	DEC 07 2018 1200
SSU-1	DEC 10 2018 0810	Jeff Lucas /CHPRC	DEC 10 2018 0810
Jeff Lucas /CHPRC	DEC 10 2018 1025	SSUA SUITE TRAIL	DEC 10 2018 1025

SPECIAL INSTRUCTIONS
TRVL-18-170
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR65602 TRVL NUM = TRVL-18-170 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8944-1
SDG Number: RL8944-1

Login Number: 8944
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8733-1
TestAmerica Sample Delivery Group: RL8733-1
Client Project/Site: F18-062

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/19/2018 12:22:31 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
y	Duplicate analysis not within control limits.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8733-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8733-1

Comments
No additional comments.

Receipt
The sample was received on 11/16/2018 8:35 AM; the sample arrived in good condition, properly preserved and, where required, on ice.

RAD
Method(s) A-01-R: The tracer yield calculated for the batch blank was above the client requested limit of 105%, all sample results are below the MDC. For more information see the attached SIR.
B3MMP7 (300-8733-1), (LCS 300-16036/2-A), (MB 300-16036/1-A) and (300-8733-B-1-D DU)

Method(s) A-01-R: The laboratory control sample (LCS) associated with preparation batch 300-16048 and analytical batch 300-16296 was outside SOW acceptance criteria but within QSM criteria. For more information see the attached SIR.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0274
Rev. Number: 0
Date Initiated: 12/11/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-062

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1

SAMPLE NUMBERS: B3MMP7

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8733-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: For the PUISO analysis, the blank has a tracer yield of 114%. Results are a non-detect.

RESOLUTION

PROPOSED RESOLUTION: Please make a comment in the case narrative and report data.

FINAL RESOLUTION: See as proposed.

SUBMITTED BY:

WORTHY, A 12/11/2018

ACCEPTED BY:

CUTSFORTH, EC 12/11/2018

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0322
Rev. Number: 0
Date Initiated: 12/18/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-062

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1

SAMPLE NUMBERS: B3MMP7

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8733-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS for U-233/234 is 122%. Sample results are a non-detect.

RESOLUTION

PROPOSED RESOLUTION: Flag, narrate, and report the results.

FINAL RESOLUTION: Please see the Proposed Resolution.

SUBMITTED BY:

WORTHY, A 12/18/2018

ACCEPTED BY:

HEY, BE 12/18/2018

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Client Sample ID: B3MMP7

Date Collected: 11/15/18 07:50
Date Received: 11/16/18 08:35

Lab Sample ID: 300-8733-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.018	U		0.0554	0.370	0.0468	pCi/g	11/20/18 14:05	11/20/18 16:05	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00846	U	0.0305	0.0305	1.00	0.0789	pCi/g	11/23/18 09:47	12/04/18 17:23	1
Pu-239/240	-0.00060	U	0.0302	0.0302	1.00	0.0554	pCi/g	11/23/18 09:47	12/04/18 17:23	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.3*		*30 - 105*	*11/23/18 09:47*	*12/04/18 17:23*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0113	U	0.0834	0.0835	1.00	0.197	pCi/g	11/23/18 10:28	12/03/18 11:48	1
U-233/234	0.0284	U o	0.0675	0.0677	1.00	0.142	pCi/g	11/23/18 10:28	12/03/18 11:48	1
U-235/236	-0.0076	U	0.0477	0.0477	1.00	0.116	pCi/g	11/23/18 10:28	12/03/18 11:48	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*51.0*		*30 - 105*	*11/23/18 10:28*	*12/03/18 11:48*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.61	U	0.0856	1.25	15.0	2.15	pCi/g	11/23/18 09:54	12/12/18 08:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.3*			*11/23/18 09:54*	*12/12/18 08:56*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Pu-242(T) (30-105)**							
300-8733-1	B3MMP7	91.3							
300-8733-1 DU	B3MMP7	93.8							
LCS 300-16036/2-A	Lab Control Sample	99.9							
MB 300-16036/1-A	Method Blank	114 X							

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**							
300-8733-1	B3MMP7	51.0							
300-8733-1 DU	B3MMP7	60.6							
LCS 300-16048/2-A	Lab Control Sample	69.5							
MB 300-16048/1-A	Method Blank	53.2							

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**							
300-8733-1	B3MMP7	91.3							
300-8733-1 DU	B3MMP7	93.8							
LCS 300-16040/2-A	Lab Control Sample	99.9							
MB 300-16040/1-A	Method Blank	114							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15972/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0128	U		0.0612	0.370	0.0442	pCi/g	11/20/18 14:05	11/20/18 16:04	1

Lab Sample ID: LCS 300-15972/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.65	2.398		0.186	0.370	0.0847	pCi/g	90	80 - 120		

Lab Sample ID: 300-8733-1 DU — **Client Sample ID: B3MMP7**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.018	U		-0.0230	U	0.0839	0.370	0.0657	pCi/g			23	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16048/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16296 — **Prep Batch: 16048**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00982	U	0.0450	0.0450	1.00	0.117	pCi/g	11/23/18 10:28	12/03/18 11:47	1
U-233/234	-0.00357	U	0.0447	0.0447	1.00	0.0968	pCi/g	11/23/18 10:28	12/03/18 11:47	1
U-235/236	-0.00179	U	0.0447	0.0447	1.00	0.0880	pCi/g	11/23/18 10:28	12/03/18 11:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*53.2*		*30 - 105*	*11/23/18 10:28*	*12/03/18 11:47*	*1*

Lab Sample ID: LCS 300-16048/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16296 — **Prep Batch: 16048**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			1.81	1.675		0.440	1.00	0.0787	pCi/g	92	80 - 120		
U-233/234			1.73	2.110	o	0.518	1.00	0.0835	pCi/g	122	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*69.5*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16296

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16048

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0113	U		-0.00622	U y	0.0391	1.00	0.0951	pCi/g			685	30
U-233/234	0.0284	U o		-0.00544	U o y	0.0390	1.00	0.0927	pCi/g			295	30
U-235/236	-0.0076	U		-0.000777	U y	0.0388	1.00	0.0712	pCi/g			163	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*60.6*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16036/1-A
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16036

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00230	U	0.0288	0.0288	1.00	0.0714	pCi/g	11/23/18 09:47	12/04/18 17:22	1
Pu-239/240	-0.00345	U	0.0289	0.0289	1.00	0.0763	pCi/g	11/23/18 09:47	12/04/18 17:22	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*114*	*X*	*30 - 105*	*11/23/18 09:47*	*12/04/18 17:22*	*1*

Lab Sample ID: LCS 300-16036/2-A
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16036

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.902	0.856		0.276	1.00	0.0812	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*99.9*		*30 - 105*

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16036

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.00846	U		-0.00460	U y	0.0289	1.00	0.0704	pCi/g			677	30
Pu-239/240	-0.00060	U		-0.000575	U	0.0288	1.00	0.0528	pCi/g			5	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*93.8*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16040/1-A
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16040

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.189	U	0.0453	1.22	15.0	2.06	pCi/g	11/23/18 09:54	12/12/18 04:51	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*114*			*11/23/18 09:54*	*12/12/18 04:51*	*1*

Lab Sample ID: LCS 300-16040/2-A
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16040

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	228.6		14.5	15.0	2.06	pCi/g	103	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*99.9*		

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16040

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.61	U		-0.164	U y	1.24	15.0	2.10	pCi/g			115	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*93.8*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

General Chemistry

Analysis Batch: 15973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8733-1	B3MMP7	Total/NA	Solid	Moisture	

Rad

Prep Batch: 15972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8733-1	B3MMP7	Total/NA	Solid	Direct Addition	
MB 300-15972/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-15972/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8733-1 DU	B3MMP7	Total/NA	Solid	Direct Addition	

Prep Batch: 16036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8733-1	B3MMP7	Total/NA	Solid	ExtChrAct	
MB 300-16036/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16036/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8733-1 DU	B3MMP7	Total/NA	Solid	ExtChrAct	

Prep Batch: 16040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8733-1	B3MMP7	Total/NA	Solid	ExtChr_LSC	
MB 300-16040/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16040/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8733-1 DU	B3MMP7	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8733-1	B3MMP7	Total/NA	Solid	ExtChrAct	
MB 300-16048/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16048/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8733-1 DU	B3MMP7	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Client Sample ID: B3MMP7

Date Collected: 11/15/18 07:50
Date Received: 11/16/18 08:35

Lab Sample ID: 300-8733-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			15973	11/20/18 14:09	TDA	TAL RCH
Total/NA	Prep	Direct Addition					15972	11/20/18 14:05	TDA	TAL RCH
Total/NA	Analysis	901.1		1	380.16 g	380.16 g	16014	11/20/18 16:05	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16048	11/23/18 10:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.07 g	1.07 g	16296	12/03/18 11:48	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16036	11/23/18 09:47	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.06 g	1.06 g	16398	12/04/18 17:23	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16040	11/23/18 09:54	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.06 g	1.06 g	16729	12/12/18 08:56	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8733-1	B3MMP7	Solid	11/15/18 07:50	11/16/18 08:35

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-072	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL EBL - 1	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF -N-507- 36	ACTUAL SAMPLE DEPTH N/A	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3MMP7	N/A	SOIL	NOV 15 2018	0750	✓	✓

RL8733-1
8733

300-8733 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 15 2018 1330	SSU-1	NOV 15 2018 1330
SSU-1	NOV 16 2018 0650	Mike Esparza /CHPRC	NOV 16 2018 0650
Mike Esparza /CHPRC	NOV 16 2018 0835	Sheri Victor S. Vict	NOV 16 2018 0835

SPECIAL INSTRUCTIONS
TRVL-19-018
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR71860 TRVL NUM = TRVL-19-018 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8733-1
SDG Number: RL8733-1

Login Number: 8733
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8809-1
TestAmerica Sample Delivery Group: RL8809-1
Client Project/Site: F18-062

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/31/2018 12:01:50 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Visit us at: www.testamericainc.com

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8809-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8809-1

Comments
No additional comments.

Receipt
The sample was received on 11/27/2018 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Client Sample ID: B3MMR1

Date Collected: 11/26/18 08:20
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8809-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.016	U		0.0897	0.370	0.0541	pCi/g	12/05/18 10:54	12/21/18 10:48	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0400	U	0.0456	0.0460	1.00	0.0605	pCi/g	12/05/18 12:28	12/12/18 16:33	1
Pu-239/240	0.000	U	0.0227	0.0227	1.00	0.0417	pCi/g	12/05/18 12:28	12/12/18 16:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.1*		*30 - 105*	*12/05/18 12:28*	*12/12/18 16:33*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0404	U	0.0787	0.0790	1.00	0.148	pCi/g	12/05/18 12:50	12/12/18 16:25	1
U-233/234	0.0195	U	0.0497	0.0498	1.00	0.107	pCi/g	12/05/18 12:50	12/12/18 16:25	1
U-235/236	0.0153	U	0.0349	0.0350	1.00	0.0725	pCi/g	12/05/18 12:50	12/12/18 16:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*74.3*		*30 - 105*	*12/05/18 12:50*	*12/12/18 16:25*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.819	U	0.103	1.22	15.0	2.34	pCi/g	12/05/18 12:46	12/28/18 20:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.1*			*12/05/18 12:46*	*12/28/18 20:51*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**Pu-242(T) (30-105)**
300-8809-1	B3MMR1	96.1
300-8809-1 DU	B3MMR1	92.2
LCS 300-16368/2-A	Lab Control Sample	94.9
MB 300-16368/1-A	Method Blank	83.2

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**
300-8809-1	B3MMR1	74.3
300-8809-1 DU	B3MMR1	86.1
LCS 300-16370/2-A	Lab Control Sample	85.3
MB 300-16370/1-A	Method Blank	86.0

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**
300-8809-1	B3MMR1	96.1
300-8809-1 DU	B3MMR1	92.2
LCS 300-16369/2-A	Lab Control Sample	94.9
MB 300-16369/1-A	Method Blank	83.2

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16361/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0220	U		0.0451	0.370	0.0608	pCi/g	12/05/18 10:54	12/21/18 10:45	1

Lab Sample ID: LCS 300-16361/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.563		0.195	0.370	0.0804	pCi/g	98	80 - 120		

Lab Sample ID: 300-8809-1 DU — **Client Sample ID: B3MMR1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.016	U		-0.0399	U y	0.0887	0.370	0.0691	pCi/g			84	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16370/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16662 — **Prep Batch: 16370**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00386	U	0.0277	0.0277	1.00	0.0658	pCi/g	12/05/18 12:50	12/12/18 16:24	1
U-233/234	-0.00441	U	0.0277	0.0277	1.00	0.0675	pCi/g	12/05/18 12:50	12/12/18 16:24	1
U-235/236	-0.000552	U	0.0276	0.0276	1.00	0.0506	pCi/g	12/05/18 12:50	12/12/18 16:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.0*		*30 - 105*	*12/05/18 12:50*	*12/12/18 16:24*	*1*

Lab Sample ID: LCS 300-16370/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16662 — **Prep Batch: 16370**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.51	3.220		0.663	1.00	0.0744	pCi/g	92	80 - 120		
U-233/234			3.36	2.874		0.607	1.00	0.0675	pCi/g	86	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*85.3*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 16662

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16370

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0404	U		-0.00266	U y	0.0266	1.00	0.0597	pCi/g			228	30
U-233/234	0.0195	U		0.0504	U y	0.0537	1.00	0.0597	pCi/g			88	30
U-235/236	0.0153	U		-0.00053 1	U y	0.0266	1.00	0.0487	pCi/g			214	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*86.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16368/1-A
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16368

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00642	U	0.0295	0.0295	1.00	0.0804	pCi/g	12/05/18 12:28	12/12/18 16:32	1
Pu-239/240	-0.00233	U	0.0293	0.0293	1.00	0.0634	pCi/g	12/05/18 12:28	12/12/18 16:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.2*		*30 - 105*	*12/05/18 12:28*	*12/12/18 16:32*	*1*

Lab Sample ID: LCS 300-16368/2-A
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16368

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.07	4.306		0.821	1.00	0.0479	pCi/g	106	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*94.9*		*30 - 105*

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16368

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0400	U		0.0367	U	0.0526	1.00	0.0829	pCi/g			9	30
Pu-239/240	0.000	U		-0.00060 1	U y	0.0301	1.00	0.0552	pCi/g			200	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*92.2*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16369/1-A
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16369

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.696	U	0.192	1.59	15.0	2.98	pCi/g	12/05/18 12:46	12/28/18 18:46	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.2*			*12/05/18 12:46*	*12/28/18 18:46*	*1*

Lab Sample ID: LCS 300-16369/2-A
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16369

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			194	228.9		14.8	15.0	2.52	pCi/g	118	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*94.9*		

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16369

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.819	U		0.644	U	1.55	15.0	3.01	pCi/g			24	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*92.2*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

General Chemistry

Analysis Batch: 16367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8809-1	B3MMR1	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8809-1	B3MMR1	Total/NA	Solid	Direct Addition	
MB 300-16361/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16361/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8809-1 DU	B3MMR1	Total/NA	Solid	Direct Addition	

Prep Batch: 16368

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8809-1	B3MMR1	Total/NA	Solid	ExtChrAct	
MB 300-16368/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16368/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8809-1 DU	B3MMR1	Total/NA	Solid	ExtChrAct	

Prep Batch: 16369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8809-1	B3MMR1	Total/NA	Solid	ExtChr_LSC	
MB 300-16369/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16369/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8809-1 DU	B3MMR1	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8809-1	B3MMR1	Total/NA	Solid	ExtChrAct	
MB 300-16370/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16370/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8809-1 DU	B3MMR1	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Client Sample ID: B3MMR1

Date Collected: 11/26/18 08:20
Date Received: 11/27/18 09:00

Lab Sample ID: 300-8809-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16367	12/05/18 12:24	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16361	12/05/18 10:54	TDA	TAL RCH
Total/NA	Analysis	901.1		1	334.01 g	334.01 g	16945	12/21/18 10:48	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16370	12/05/18 12:50	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1 g	1 g	16662	12/12/18 16:25	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16368	12/05/18 12:28	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.24 g	1.24 g	16661	12/12/18 16:33	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16369	12/05/18 12:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.24 g	1.24 g	17051	12/28/18 20:51	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8809-1	B3MMR1	Solid	11/26/18 08:20	11/27/18 09:00

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-076	PAGE 1 OF 1
COLLECTOR Kevin Patterson CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL EBL - 2	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH N/A	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3MMR1	N/A	SOIL	NOV 2 6 2013	0820	✓	✓

RL 8809-1

300-8809 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson CHPRC	NOV 2 6 2013 1430	SSU-1	NOV 2 6 2013 1430
SSU-1	NOV 2 7 2018 0745	Jeff Lucas /CHPRC	NOV 2 7 2018 0745
Jeff Lucas /CHPRC	NOV 2 7 2018 0400	B. Jorgenson TARL	NOV 2 7 2018 0400

SPECIAL INSTRUCTIONS
TRVL-19-018
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR71861 TRVL NUM = TRVL-19-018 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8809-1
SDG Number: RL8809-1

Login Number: 8809
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8854-1
TestAmerica Sample Delivery Group: RL8854-1
Client Project/Site: F18-062

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/21/2018 10:35:32 AM
Steven Campbell, Project Manager I
steven.campbell@testamericainc.com

Designee for

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8854-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8854-1

Comments
No additional comments.

Receipt
The samples were received on 11/30/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)
The Plutonium-242 tracer yield recovery in the sample duplicate exceeds acceptance criteria. All client samples and the sample duplicate are non-detects and all other analytical parameters are met. A SIR has been issued for this departure from acceptance criteria. No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: ST-RC-0245 - Plutonium-241 (LSC)
The Plutonium-242 tracer yield recovery in the sample duplicate exceeds acceptance criteria. All client samples and the sample duplicate are non-detects and all other analytical parameters are met. A SIR has been issued for this departure from acceptance criteria. No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M420

Date Collected: 11/29/18 12:48
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.012	U		0.0765	0.370	0.0729	pCi/g	12/07/18 11:24	12/19/18 16:00	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0033	U	0.0272	0.0272	1.00	0.0629	pCi/g	12/07/18 12:19	12/18/18 09:20	1
Pu-239/240	0.0103	U	0.0272	0.0273	1.00	0.0629	pCi/g	12/07/18 12:19	12/18/18 09:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.6*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.108**		0.0820	0.0838	1.00	0.0569	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-233/234	**0.109**		0.0820	0.0838	1.00	0.0569	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-235/236	0.0155	U	0.0310	0.0311	1.00	0.0569	pCi/g	12/07/18 12:21	12/19/18 16:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*81.5*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:37*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.06	U	0.0930	1.17	15.0	1.97	pCi/g	12/07/18 13:41	12/20/18 01:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.6*			*12/07/18 13:41*	*12/20/18 01:44*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M436
Date Collected: 11/29/18 12:02
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-2
Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.053	U		0.114	0.370	0.0873	pCi/g	12/07/18 11:24	12/19/18 16:54	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00889	U	0.0248	0.0249	1.00	0.0589	pCi/g	12/07/18 12:19	12/18/18 09:18	1
Pu-239/240	-0.00099	U	0.0247	0.0247	1.00	0.0487	pCi/g	12/07/18 12:19	12/18/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*97.4*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.175**		0.0972	0.101	1.00	0.0495	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-233/234	**0.148**		0.0894	0.0924	1.00	0.0495	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-235/236	0.000	U	0.0270	0.0270	1.00	0.0495	pCi/g	12/07/18 12:21	12/19/18 16:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.3*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:37*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.287	U	0.0449	0.984	15.0	1.71	pCi/g	12/07/18 13:41	12/20/18 05:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*97.4*			*12/07/18 13:41*	*12/20/18 05:49*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M460

Date Collected: 11/29/18 09:18
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-3

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0210	U		0.0784	0.370	0.0822	pCi/g	12/07/18 11:24	12/19/18 16:54	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0034	U	0.0216	0.0216	1.00	0.0525	pCi/g	12/07/18 12:19	12/18/18 09:18	1
Pu-239/240	-0.00086	U	0.0215	0.0215	1.00	0.0423	pCi/g	12/07/18 12:19	12/18/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.4*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.145**		0.0943	0.0973	1.00	0.0692	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-233/234	**0.0990**		0.0790	0.0806	1.00	0.0747	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-235/236	0.0137	U	0.0299	0.0299	1.00	0.0589	pCi/g	12/07/18 12:21	12/19/18 16:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*75.9*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:37*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.631	U	0.0513	0.914	15.0	1.56	pCi/g	12/07/18 13:41	12/20/18 07:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.4*			*12/07/18 13:41*	*12/20/18 07:51*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M472

Date Collected: 11/29/18 12:02
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-4

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0290	U		0.0595	0.370	0.0781	pCi/g	12/07/18 11:24	12/19/18 16:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0086	U	0.0273	0.0274	1.00	0.0767	pCi/g	12/07/18 12:19	12/18/18 09:18	1
Pu-239/240	-0.0022	U	0.0271	0.0271	1.00	0.0585	pCi/g	12/07/18 12:19	12/18/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.0*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0519	U	0.0530	0.0536	1.00	0.0523	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-233/234	**0.0652**		0.0593	0.0601	1.00	0.0523	pCi/g	12/07/18 12:21	12/19/18 16:37	1
U-235/236	0.0133	U	0.0265	0.0266	1.00	0.0486	pCi/g	12/07/18 12:21	12/19/18 16:37	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*90.8*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:37*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.35	U	0.125	1.18	15.0	1.95	pCi/g	12/07/18 13:41	12/20/18 09:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.0*			*12/07/18 13:41*	*12/20/18 09:53*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M440

Date Collected: 11/29/18 11:35
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-5

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0230	U		0.103	0.370	0.101	pCi/g	12/07/18 11:24	12/19/18 16:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.012	U	0.0309	0.0309	1.00	0.0901	pCi/g	12/07/18 12:19	12/18/18 09:18	1
Pu-239/240	-0.0024	U	0.0305	0.0305	1.00	0.0660	pCi/g	12/07/18 12:19	12/18/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.7*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.110**		0.0780	0.0799	1.00	0.0506	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-233/234	**0.0827**		0.0675	0.0688	1.00	0.0506	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-235/236	-0.0011	U	0.0276	0.0276	1.00	0.0544	pCi/g	12/07/18 12:21	12/19/18 16:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.4*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:38*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.55	U	0.121	1.37	15.0	2.30	pCi/g	12/07/18 13:41	12/20/18 11:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.7*			*12/07/18 13:41*	*12/20/18 11:56*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M452

Date Collected: 11/29/18 07:53
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-6

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.042	U		0.122	0.370	0.0970	pCi/g	12/07/18 11:24	12/19/18 17:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0085	U	0.0308	0.0308	1.00	0.0839	pCi/g	12/07/18 12:19	12/18/18 09:18	1
Pu-239/240	-0.0018	U	0.0305	0.0305	1.00	0.0634	pCi/g	12/07/18 12:19	12/18/18 09:18	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*97.0*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:18*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0613**		0.0577	0.0585	1.00	0.0598	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-233/234	**0.206**		0.103	0.108	1.00	0.0473	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-235/236	-0.00052	U	0.0258	0.0258	1.00	0.0473	pCi/g	12/07/18 12:21	12/19/18 16:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*80.0*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:38*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.543	U	0.116	1.20	15.0	2.05	pCi/g	12/07/18 13:41	12/20/18 13:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*97.0*			*12/07/18 13:41*	*12/20/18 13:58*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M468

Date Collected: 11/29/18 10:37
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-7

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.028	U		0.102	0.370	0.0887	pCi/g	12/07/18 11:24	12/19/18 17:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0053	U	0.0191	0.0191	1.00	0.0521	pCi/g	12/07/18 12:19	12/18/18 09:19	1
Pu-239/240	-0.0015	U	0.0190	0.0190	1.00	0.0410	pCi/g	12/07/18 12:19	12/18/18 09:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*94.1*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:19*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.201**		0.122	0.126	1.00	0.0672	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-233/234	**0.0916**		0.0819	0.0833	1.00	0.0672	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-235/236	0.0169	U	0.0367	0.0368	1.00	0.0723	pCi/g	12/07/18 12:21	12/19/18 16:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*67.7*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:38*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.719	U	0.0815	0.852	15.0	1.43	pCi/g	12/07/18 13:41	12/20/18 16:01	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*94.1*			*12/07/18 13:41*	*12/20/18 16:01*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M464

Date Collected: 11/29/18 10:00
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-8

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0096	U		0.0980	0.370	0.0949	pCi/g	12/07/18 11:24	12/19/18 17:56	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0028	U	0.0237	0.0237	1.00	0.0547	pCi/g	12/07/18 12:19	12/18/18 09:19	1
Pu-239/240	0.000	U	0.0236	0.0236	1.00	0.0432	pCi/g	12/07/18 12:19	12/18/18 09:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.2*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:19*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0790**		0.0611	0.0623	1.00	0.0501	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-233/234	**0.137**		0.0800	0.0827	1.00	0.0481	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-235/236	0.0106	U	0.0231	0.0232	1.00	0.0456	pCi/g	12/07/18 12:21	12/19/18 16:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*97.6*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:38*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.37	U	0.0688	0.994	15.0	1.80	pCi/g	12/07/18 13:41	12/20/18 18:03	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.2*			*12/07/18 13:41*	*12/20/18 18:03*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M456

Date Collected: 11/29/18 08:38
Date Received: 11/30/18 09:00

Lab Sample ID: 300-8854-9

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0038	U		0.0791	0.370	0.0798	pCi/g	12/07/18 11:24	12/19/18 17:57	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0060	U	0.0234	0.0234	1.00	0.0626	pCi/g	12/07/18 12:19	12/18/18 09:19	1
Pu-239/240	-0.00046	U	0.0231	0.0231	1.00	0.0424	pCi/g	12/07/18 12:19	12/18/18 09:19	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.4*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:19*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.137**		0.0864	0.0890	1.00	0.0501	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-233/234	**0.0956**		0.0723	0.0738	1.00	0.0501	pCi/g	12/07/18 12:21	12/19/18 16:38	1
U-235/236	-0.00055	U	0.0273	0.0273	1.00	0.0501	pCi/g	12/07/18 12:21	12/19/18 16:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.2*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:38*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.37	U	0.0672	0.943	15.0	1.70	pCi/g	12/07/18 13:41	12/20/18 22:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.4*			*12/07/18 13:41*	*12/20/18 22:08*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8854-1	B3M420	96.6
300-8854-1 DU	B3M420	113 X
300-8854-2	B3M436	97.4
300-8854-3	B3M460	90.4
300-8854-4	B3M472	96.0
300-8854-5	B3M440	83.7
300-8854-6	B3M452	97.0
300-8854-7	B3M468	94.1
300-8854-8	B3M464	91.2
300-8854-9	B3M456	95.4
LCS 300-16458/2-A	Lab Control Sample	93.9
MB 300-16458/1-A	Method Blank	91.1

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8854-1	B3M420	81.5
300-8854-1 DU	B3M420	83.3
300-8854-2	B3M436	83.3
300-8854-3	B3M460	75.9
300-8854-4	B3M472	90.8
300-8854-5	B3M440	86.4
300-8854-6	B3M452	80.0
300-8854-7	B3M468	67.7
300-8854-8	B3M464	97.6
300-8854-9	B3M456	83.2
LCS 300-16459/2-A	Lab Control Sample	90.1
MB 300-16459/1-A	Method Blank	90.2

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8854-1	B3M420	96.6
300-8854-1 DU	B3M420	113
300-8854-2	B3M436	97.4
300-8854-3	B3M460	90.4
300-8854-4	B3M472	96.0
300-8854-5	B3M440	83.7

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Pu-242 (T)
Lab Sample ID	**Client Sample ID**	
300-8854-6	B3M452	97.0
300-8854-7	B3M468	94.1
300-8854-8	B3M464	91.2
300-8854-9	B3M456	95.4
LCS 300-16467/2-A	Lab Control Sample	93.9
MB 300-16467/1-A	Method Blank	91.1

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16455/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0186	U		0.0686	0.370	0.0538	pCi/g	12/07/18 11:24	12/19/18 15:59	1

Lab Sample ID: LCS 300-16455/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.577		0.198	0.370	0.0662	pCi/g	98	80 - 120		

Lab Sample ID: 300-8854-1 DU — **Client Sample ID: B3M420**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.012	U		0.00822	U y	0.0730	0.370	0.0782	pCi/g			1087	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16459/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16847 — **Prep Batch: 16459**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00113	U	0.0284	0.0284	1.00	0.0560	pCi/g	12/07/18 12:21	12/19/18 16:36	1
U-233/234	-0.00113	U	0.0284	0.0284	1.00	0.0560	pCi/g	12/07/18 12:21	12/19/18 16:36	1
U-235/236	-0.000567	U	0.0284	0.0284	1.00	0.0521	pCi/g	12/07/18 12:21	12/19/18 16:36	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*90.2*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:36*	*1*

Lab Sample ID: LCS 300-16459/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16847 — **Prep Batch: 16459**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.59	2.860		0.619	1.00	0.0577	pCi/g	80	80 - 120		
U-233/234			3.43	3.409		0.710	1.00	0.0621	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*90.1*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8854-1 DU — **Client Sample ID: B3M420**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16847 — **Prep Batch: 16459**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.108			0.133		0.0918	1.00	0.0588	pCi/g			21	30
U-233/234	0.109			0.0733	y	0.0676	1.00	0.0588	pCi/g			39	30
U-235/236	0.0155	U		0.0292	U y	0.0424	1.00	0.0547	pCi/g			61	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*83.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16458/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16776 — **Prep Batch: 16458**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00280	U	0.0352	0.0352	1.00	0.0761	pCi/g	12/07/18 12:19	12/18/18 09:19	1
Pu-239/240	-0.00421	U	0.0352	0.0352	1.00	0.0814	pCi/g	12/07/18 12:19	12/18/18 09:19	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.1*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:19*	*1*

Lab Sample ID: LCS 300-16458/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16776 — **Prep Batch: 16458**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.83	4.850		0.932	1.00	0.0953	pCi/g	100	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*93.9*		*30 - 105*

Lab Sample ID: 300-8854-1 DU — **Client Sample ID: B3M420**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16776 — **Prep Batch: 16458**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0033	U		0.000	U y	0.0264	1.00	0.0546	pCi/g			200	30
Pu-239/240	0.0103	U		-0.00158	U y	0.0264	1.00	0.0619	pCi/g			273	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*113*	*X*	*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16467/1-A
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16467

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.818	U	0.0685	1.28	15.0	2.18	pCi/g	12/07/18 13:41	12/19/18 21:38	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.1*			*12/07/18 13:41*	*12/19/18 21:38*	*1*

Lab Sample ID: LCS 300-16467/2-A
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16467

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			233	252.0		16.0	15.0	2.23	pCi/g	108	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*93.9*		

Lab Sample ID: 300-8854-1 DU
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: B3M420
Prep Type: Total/NA
Prep Batch: 16467

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.06	U		0.751	U y	1.07	15.0	1.83	pCi/g			34	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*113*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

General Chemistry

Analysis Batch: 16456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-1	B3M420	Total/NA	Solid	Moisture	
300-8854-2	B3M436	Total/NA	Solid	Moisture	
300-8854-3	B3M460	Total/NA	Solid	Moisture	
300-8854-4	B3M472	Total/NA	Solid	Moisture	
300-8854-5	B3M440	Total/NA	Solid	Moisture	
300-8854-6	B3M452	Total/NA	Solid	Moisture	
300-8854-7	B3M468	Total/NA	Solid	Moisture	
300-8854-8	B3M464	Total/NA	Solid	Moisture	
300-8854-9	B3M456	Total/NA	Solid	Moisture	
300-8854-1 DU	B3M420	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-1	B3M420	Total/NA	Solid	Direct Addition	
300-8854-2	B3M436	Total/NA	Solid	Direct Addition	
300-8854-3	B3M460	Total/NA	Solid	Direct Addition	
300-8854-4	B3M472	Total/NA	Solid	Direct Addition	
300-8854-5	B3M440	Total/NA	Solid	Direct Addition	
300-8854-6	B3M452	Total/NA	Solid	Direct Addition	
300-8854-7	B3M468	Total/NA	Solid	Direct Addition	
300-8854-8	B3M464	Total/NA	Solid	Direct Addition	
300-8854-9	B3M456	Total/NA	Solid	Direct Addition	
MB 300-16455/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16455/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8854-1 DU	B3M420	Total/NA	Solid	Direct Addition	

Prep Batch: 16458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-1	B3M420	Total/NA	Solid	ExtChrAct	
300-8854-2	B3M436	Total/NA	Solid	ExtChrAct	
300-8854-3	B3M460	Total/NA	Solid	ExtChrAct	
300-8854-4	B3M472	Total/NA	Solid	ExtChrAct	
300-8854-5	B3M440	Total/NA	Solid	ExtChrAct	
300-8854-6	B3M452	Total/NA	Solid	ExtChrAct	
300-8854-7	B3M468	Total/NA	Solid	ExtChrAct	
300-8854-8	B3M464	Total/NA	Solid	ExtChrAct	
300-8854-9	B3M456	Total/NA	Solid	ExtChrAct	
MB 300-16458/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16458/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8854-1 DU	B3M420	Total/NA	Solid	ExtChrAct	

Prep Batch: 16459

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-1	B3M420	Total/NA	Solid	ExtChrAct	
300-8854-2	B3M436	Total/NA	Solid	ExtChrAct	
300-8854-3	B3M460	Total/NA	Solid	ExtChrAct	
300-8854-4	B3M472	Total/NA	Solid	ExtChrAct	
300-8854-5	B3M440	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Rad (Continued)

Prep Batch: 16459 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-6	B3M452	Total/NA	Solid	ExtChrAct	
300-8854-7	B3M468	Total/NA	Solid	ExtChrAct	
300-8854-8	B3M464	Total/NA	Solid	ExtChrAct	
300-8854-9	B3M456	Total/NA	Solid	ExtChrAct	
MB 300-16459/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16459/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8854-1 DU	B3M420	Total/NA	Solid	ExtChrAct	

Prep Batch: 16467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8854-1	B3M420	Total/NA	Solid	ExtChr_LSC	
300-8854-2	B3M436	Total/NA	Solid	ExtChr_LSC	
300-8854-3	B3M460	Total/NA	Solid	ExtChr_LSC	
300-8854-4	B3M472	Total/NA	Solid	ExtChr_LSC	
300-8854-5	B3M440	Total/NA	Solid	ExtChr_LSC	
300-8854-6	B3M452	Total/NA	Solid	ExtChr_LSC	
300-8854-7	B3M468	Total/NA	Solid	ExtChr_LSC	
300-8854-8	B3M464	Total/NA	Solid	ExtChr_LSC	
300-8854-9	B3M456	Total/NA	Solid	ExtChr_LSC	
MB 300-16467/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16467/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8854-1 DU	B3M420	Total/NA	Solid	ExtChr_LSC	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M420

Lab Sample ID: 300-8854-1
Date Collected: 11/29/18 12:48
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	376.78 g	376.78 g	16842	12/19/18 16:00	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.08 g	1.08 g	16776	12/18/18 09:20	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.01 g	1.01 g	16847	12/19/18 16:37	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.08 g	1.08 g	16884	12/20/18 01:44	DJ	TAL RCH

Client Sample ID: B3M436

Lab Sample ID: 300-8854-2
Date Collected: 11/29/18 12:02
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	389.22 g	389.22 g	16842	12/19/18 16:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.23 g	1.23 g	16776	12/18/18 09:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16847	12/19/18 16:37	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.23 g	1.23 g	16884	12/20/18 05:49	DJ	TAL RCH

Client Sample ID: B3M460

Lab Sample ID: 300-8854-3
Date Collected: 11/29/18 09:18
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	408.33 g	408.33 g	16842	12/19/18 16:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.46 g	1.46 g	16776	12/18/18 09:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.2 g	1.2 g	16847	12/19/18 16:37	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.46 g	1.46 g	16884	12/20/18 07:51	DJ	TAL RCH

Client Sample ID: B3M472

Lab Sample ID: 300-8854-4

Date Collected: 11/29/18 12:02

Matrix: Solid

Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	387.24 g	387.24 g	16842	12/19/18 16:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16776	12/18/18 09:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16847	12/19/18 16:37	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.1 g	1.1 g	16884	12/20/18 09:53	DJ	TAL RCH

Client Sample ID: B3M440

Lab Sample ID: 300-8854-5

Date Collected: 11/29/18 11:35

Matrix: Solid

Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	340.03 g	340.03 g	16842	12/19/18 16:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.09 g	1.09 g	16776	12/18/18 09:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.13 g	1.13 g	16847	12/19/18 16:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.09 g	1.09 g	16884	12/20/18 11:56	DJ	TAL RCH

Client Sample ID: B3M452

Lab Sample ID: 300-8854-6

Date Collected: 11/29/18 07:53

Matrix: Solid

Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	378.41 g	378.41 g	16842	12/19/18 17:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	16776	12/18/18 09:18	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.25 g	1.25 g	16847	12/19/18 16:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.03 g	1.03 g	16884	12/20/18 13:58	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Client Sample ID: B3M468

Lab Sample ID: 300-8854-7
Date Collected: 11/29/18 10:37
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	379.89 g	379.89 g	16842	12/19/18 17:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.53 g	1.53 g	16776	12/18/18 09:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16847	12/19/18 16:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.53 g	1.53 g	16884	12/20/18 16:01	DJ	TAL RCH

Client Sample ID: B3M464

Lab Sample ID: 300-8854-8
Date Collected: 11/29/18 10:00
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	350.44 g	350.44 g	16842	12/19/18 17:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	16776	12/18/18 09:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.15 g	1.15 g	16847	12/19/18 16:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.26 g	1.26 g	16884	12/20/18 18:03	DJ	TAL RCH

Client Sample ID: B3M456

Lab Sample ID: 300-8854-9
Date Collected: 11/29/18 08:38
Matrix: Solid
Date Received: 11/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16456	12/07/18 11:31	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16455	12/07/18 11:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	379.52 g	379.52 g	16842	12/19/18 17:57	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16458	12/07/18 12:19	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.27 g	1.27 g	16776	12/18/18 09:19	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16459	12/07/18 12:21	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16847	12/19/18 16:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16467	12/07/18 13:41	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.27 g	1.27 g	16884	12/20/18 22:08	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8854-1	B3M420	Solid	11/29/18 12:48	11/30/18 09:00
300-8854-2	B3M436	Solid	11/29/18 12:02	11/30/18 09:00
300-8854-3	B3M460	Solid	11/29/18 09:18	11/30/18 09:00
300-8854-4	B3M472	Solid	11/29/18 12:02	11/30/18 09:00
300-8854-5	B3M440	Solid	11/29/18 11:35	11/30/18 09:00
300-8854-6	B3M452	Solid	11/29/18 07:53	11/30/18 09:00
300-8854-7	B3M468	Solid	11/29/18 10:37	11/30/18 09:00
300-8854-8	B3M464	Solid	11/29/18 10:00	11/30/18 09:00
300-8854-9	B3M456	Solid	11/29/18 08:38	11/30/18 09:00

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-008	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Layback 2	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M420	N/A	SOIL	NOV 2 9 2018	1245	✓	✓

8854

300-8854 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Burghard TAIL	NOV 3 0 2018 0900

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69286 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-024	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 6	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

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12/21/2018

8854

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M436	N/A	SOIL	NOV 2 9 2018	1202	✓	✓

CHAIN OF POSSESSION: RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Bryant CARL	NOV 3 0 2018 0900

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69290 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

Appendix D

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-048	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Layback 12	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

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SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M460	N/A	SOIL	NOV 2 9 2018	0918	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Burglows Olg TARL	NOV 3 0 2018 0900

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69296 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

D-553

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-060	PAGE 1 OF 1
COLLECTOR: Malcom Chunn, CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback DUP 1	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8854

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M472	N/A	SOIL	NOV 29 2018	1202	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 29 2018 1430	SSU-1	NOV 29 2018 1430
SSU-1	NOV 30 2018 0645	Jeff Lucas /CHPRC	NOV 30 2018 0645
Jeff Lucas /CHPRC	NOV 30 2018 0900	Charlette Burghard TAR	NOV 30 2018 0900

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69299 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-028	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 7	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8854

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M440	N/A	SOIL	NOV 29 2018	1135	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 29 2018 1130	SSU-1	NOV 29 2018 1430
SSU-1	NOV 30 2018 0645	Jeff Lucas /CHPRC	NOV 30 2018 0645
Jeff Lucas /CHPRC	NOV 30 2018 0900	Cherette Burghed TAPL	NOV 30 2018 0900

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69291 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-040	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Layback 10	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8854

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M452	N/A	SOIL	NOV 2 9 2018	0753	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MRC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Burghard TARL	NOV 3 0 2018 0900

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240};
UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};
PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69294 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-056	PAGE 1 OF 1
COLLECTOR: Malcom Chunn CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 14	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8854

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M468	N/A	SOIL	NOV 2 9 2018	1037	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Burgland CB TAEL	NOV 3 0 2018 0900

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69298 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-052	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Layback 13	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M464	N/A	SOIL	NOV 2 9 2018	1000	✓	✓

8854

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MCC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC JL	NOV 3 0 2018 0645
Jeff Lucas /CHPRC JL	NOV 3 0 2018 0900	Charlette Bugbee CB TARL	NOV 3 0 2018 0900

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69297 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-044	PAGE 1 OF 1
COLLECTOR Malcom Chunn CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL Layback 11	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH 0"-6"	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8854

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M456	N/A	SOIL	NOV 2 9 2018	0838	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chunn CHPRC MC	NOV 2 9 2018 1430	SSU-1	NOV 2 9 2018 1430
SSU-1	NOV 3 0 2018 0645	Jeff Lucas /CHPRC	NOV 3 0 2018 0645
Jeff Lucas /CHPRC	NOV 3 0 2018 0900	Charlette Bunghard CB TAXL	NOV 3 0 2018 0900

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69295 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8854-1
SDG Number: RL8854-1

Login Number: 8854
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8902-1
TestAmerica Sample Delivery Group: RL8902-1
Client Project/Site: F18-062

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
12/21/2018 11:09:17 AM
Steven Campbell, Project Manager I
steven.campbell@testamericainc.com

Designee for

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8902-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8902-1

Comments
No additional comments.

Receipt
The samples were received on 12/4/2018 10:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD
Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method: ST-RC-0245 - Plutonium-241 (LSC)
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M428

Date Collected: 12/03/18 13:25
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.11	U		0.128	0.370	0.0794	pCi/g	12/07/18 14:10	12/19/18 13:55	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0040	U	0.0287	0.0287	1.00	0.0682	pCi/g	12/14/18 15:30	12/19/18 17:53	1
Pu-239/240	-0.0051	U	0.0288	0.0288	1.00	0.0716	pCi/g	12/14/18 15:30	12/19/18 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*95.2*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:53*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.113**		0.0724	0.0744	1.00	0.0810	pCi/g	12/14/18 16:10	12/19/18 16:33	1
U-233/234	**0.0939**		0.0619	0.0635	1.00	0.0579	pCi/g	12/14/18 16:10	12/19/18 16:33	1
U-235/236	0.0171	U	0.0264	0.0265	1.00	0.0405	pCi/g	12/14/18 16:10	12/19/18 16:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*96.9*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:33*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.12	U	0.189	1.73	15.0	3.02	pCi/g	12/14/18 15:46	12/20/18 16:48	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*95.2*			*12/14/18 15:46*	*12/20/18 16:48*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M448

Date Collected: 12/03/18 12:51
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-2

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.000114	U		0.107	0.370	0.0948	pCi/g	12/07/18 14:10	12/19/18 14:53	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0075	U	0.0236	0.0236	1.00	0.0662	pCi/g	12/14/18 15:30	12/19/18 17:51	1
Pu-239/240	-0.0019	U	0.0234	0.0234	1.00	0.0506	pCi/g	12/14/18 15:30	12/19/18 17:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.7*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0999**		0.0697	0.0715	1.00	0.0595	pCi/g	12/14/18 16:10	12/19/18 16:34	1
U-233/234	**0.0799**		0.0615	0.0627	1.00	0.0483	pCi/g	12/14/18 16:10	12/19/18 16:34	1
U-235/236	0.0111	U	0.0232	0.0233	1.00	0.0426	pCi/g	12/14/18 16:10	12/19/18 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*82.5*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:34*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.273	U	0.0639	1.27	15.0	2.28	pCi/g	12/14/18 15:46	12/20/18 18:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.7*			*12/14/18 15:46*	*12/20/18 18:52*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M444

Date Collected: 12/03/18 10:50
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-3

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00793	U		0.0881	0.370	0.0899	pCi/g	12/07/18 14:10	12/19/18 14:53	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00695	U	0.0352	0.0352	1.00	0.0973	pCi/g	12/14/18 15:30	12/19/18 17:51	1
Pu-239/240	0.0320	U	0.0492	0.0495	1.00	0.0755	pCi/g	12/14/18 15:30	12/19/18 17:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*81.5*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.116**		0.0840	0.0861	1.00	0.0668	pCi/g	12/14/18 16:10	12/19/18 16:34	1
U-233/234	0.0279	U	0.0420	0.0423	1.00	0.0618	pCi/g	12/14/18 16:10	12/19/18 16:34	1
U-235/236	-0.0018	U	0.0297	0.0297	1.00	0.0618	pCi/g	12/14/18 16:10	12/19/18 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*65.0*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:34*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.54	U	0.167	2.18	15.0	3.82	pCi/g	12/14/18 15:46	12/20/18 19:54	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*81.5*			*12/14/18 15:46*	*12/20/18 19:54*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M416

Date Collected: 12/03/18 12:27
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-4

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0481	U		0.0528	0.370	0.0841	pCi/g	12/07/18 14:10	12/19/18 14:53	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.015	U	0.0290	0.0291	1.00	0.0913	pCi/g	12/14/18 15:30	12/19/18 17:52	1
Pu-239/240	0.000	U	0.0285	0.0285	1.00	0.0522	pCi/g	12/14/18 15:30	12/19/18 17:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.9*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.116**		0.0843	0.0863	1.00	0.0691	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-233/234	**0.133**		0.0893	0.0919	1.00	0.0588	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-235/236	0.0143	U	0.0298	0.0299	1.00	0.0547	pCi/g	12/14/18 16:10	12/19/18 16:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*65.8*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:35*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.216	U	0.0610	1.63	15.0	2.95	pCi/g	12/14/18 15:46	12/20/18 20:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.9*			*12/14/18 15:46*	*12/20/18 20:56*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M432

Date Collected: 12/03/18 11:21
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-5

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0932	U		0.0725	0.370	0.103	pCi/g	12/07/18 14:10	12/19/18 14:54	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0045	U	0.0253	0.0253	1.00	0.0628	pCi/g	12/14/18 15:30	12/19/18 17:52	1
Pu-239/240	0.000	U	0.0251	0.0251	1.00	0.0460	pCi/g	12/14/18 15:30	12/19/18 17:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.0*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.0754**		0.0555	0.0567	1.00	0.0561	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-233/234	**0.123**		0.0692	0.0716	1.00	0.0533	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-235/236	0.0251	U	0.0321	0.0323	1.00	0.0441	pCi/g	12/14/18 16:10	12/19/18 16:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*93.7*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:35*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.376	U	0.0479	1.53	15.0	2.75	pCi/g	12/14/18 15:46	12/20/18 21:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.0*			*12/14/18 15:46*	*12/20/18 21:58*	*1*

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M424

Date Collected: 12/03/18 11:58
Date Received: 12/04/18 10:45

Lab Sample ID: 300-8902-6

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.053	U		0.127	0.370	0.0989	pCi/g	12/07/18 14:10	12/19/18 15:59	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0065	U	0.0234	0.0234	1.00	0.0648	pCi/g	12/14/18 15:30	12/19/18 17:52	1
Pu-239/240	-0.00046	U	0.0232	0.0232	1.00	0.0432	pCi/g	12/14/18 15:30	12/19/18 17:52	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*102*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:52*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**0.188**		0.120	0.124	1.00	0.122	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-233/234	0.0273	U	0.0472	0.0474	1.00	0.0834	pCi/g	12/14/18 16:10	12/19/18 16:35	1
U-235/236	-0.0020	U	0.0334	0.0334	1.00	0.0693	pCi/g	12/14/18 16:10	12/19/18 16:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*74.2*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:35*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.044	U	0.0736	1.38	15.0	2.51	pCi/g	12/14/18 15:46	12/20/18 23:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*102*			*12/14/18 15:46*	*12/20/18 23:00*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8902-1	B3M428	95.2
300-8902-1 DU	B3M428	96.3
300-8902-2	B3M448	99.7
300-8902-3	B3M444	81.5
300-8902-4	B3M416	91.9
300-8902-5	B3M432	90.0
300-8902-6	B3M424	102
LCS 300-16666/2-A	Lab Control Sample	104
MB 300-16666/1-A	Method Blank	85.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8902-1	B3M428	96.9
300-8902-1 DU	B3M428	81.0
300-8902-2	B3M448	82.5
300-8902-3	B3M444	65.0
300-8902-4	B3M416	65.8
300-8902-5	B3M432	93.7
300-8902-6	B3M424	74.2
LCS 300-16671/2-A	Lab Control Sample	75.2
MB 300-16671/1-A	Method Blank	45.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8902-1	B3M428	95.2
300-8902-1 DU	B3M428	96.3
300-8902-2	B3M448	99.7
300-8902-3	B3M444	81.5
300-8902-4	B3M416	91.9
300-8902-5	B3M432	90.0
300-8902-6	B3M424	102
LCS 300-16668/2-A	Lab Control Sample	104
MB 300-16668/1-A	Method Blank	85.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16474/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0137	U		0.0677	0.370	0.0493	pCi/g	12/07/18 14:10	12/19/18 13:54	1

Lab Sample ID: LCS 300-16474/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.415		0.189	0.370	0.121	pCi/g	92	80 - 120

Lab Sample ID: 300-8902-1 DU — **Client Sample ID: B3M428**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.11	U	0.0551	U y	0.0673	0.370	0.0922	pCi/g	603	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16671/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16848 — **Prep Batch: 16671**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00696	U	0.0499	0.0500	1.00	0.119	pCi/g	12/14/18 16:10	12/19/18 16:32	1
U-233/234	-0.00795	U	0.0500	0.0500	1.00	0.122	pCi/g	12/14/18 16:10	12/19/18 16:32	1
U-235/236	-0.000994	U	0.0497	0.0497	1.00	0.0912	pCi/g	12/14/18 16:10	12/19/18 16:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*45.5*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:32*	*1*

Lab Sample ID: LCS 300-16671/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16848 — **Prep Batch: 16671**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.69	3.204		0.703	1.00	0.0899	pCi/g	87	80 - 120
U-233/234	3.53	3.646		0.777	1.00	0.0815	pCi/g	103	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*75.2*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8902-1 DU
Matrix: Solid
Analysis Batch: 16848

Client Sample ID: B3M428
Prep Type: Total/NA
Prep Batch: 16671

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.113			0.0973		0.0675	1.00	0.0456	pCi/g			15	30
U-233/234	0.0939			0.141	y	0.0820	1.00	0.0456	pCi/g			40	30
U-235/236	0.0171	U		0.0110	U y	0.0220	1.00	0.0402	pCi/g			44	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*81.0*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16666/1-A
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16666

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00293	U	0.0367	0.0367	1.00	0.0794	pCi/g	12/14/18 15:30	12/19/18 17:52	1
Pu-239/240	-0.00439	U	0.0368	0.0368	1.00	0.0850	pCi/g	12/14/18 15:30	12/19/18 17:52	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*85.6*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:52*	*1*

Lab Sample ID: LCS 300-16666/2-A
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16666

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.28	4.028		0.751	1.00	0.0772	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*104*		*30 - 105*

Lab Sample ID: 300-8902-1 DU
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: B3M428
Prep Type: Total/NA
Prep Batch: 16666

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0040	U		-0.000629	U y	0.0315	1.00	0.0577	pCi/g			146	30
Pu-239/240	-0.0051	U		-0.00189	U y	0.0315	1.00	0.0654	pCi/g			93	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*96.3*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16668/1-A
Matrix: Solid
Analysis Batch: 16885

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16668

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.425	U	0.151	1.90	15.0	3.31	pCi/g	12/14/18 15:46	12/20/18 14:44	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.6*			*12/14/18 15:46*	*12/20/18 14:44*	*1*

Lab Sample ID: LCS 300-16668/2-A
Matrix: Solid
Analysis Batch: 16885

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16668

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			206	204.5		13.5	15.0	2.68	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*104*		

Lab Sample ID: 300-8902-1 DU
Matrix: Solid
Analysis Batch: 16885

Client Sample ID: B3M428
Prep Type: Total/NA
Prep Batch: 16668

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.12	U		-0.426	U y	1.51	15.0	2.79	pCi/g			446	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*96.3*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

General Chemistry

Analysis Batch: 16480

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-1	B3M428	Total/NA	Solid	Moisture	
300-8902-2	B3M448	Total/NA	Solid	Moisture	
300-8902-3	B3M444	Total/NA	Solid	Moisture	
300-8902-4	B3M416	Total/NA	Solid	Moisture	
300-8902-5	B3M432	Total/NA	Solid	Moisture	
300-8902-6	B3M424	Total/NA	Solid	Moisture	
300-8902-1 DU	B3M428	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-1	B3M428	Total/NA	Solid	Direct Addition	
300-8902-2	B3M448	Total/NA	Solid	Direct Addition	
300-8902-3	B3M444	Total/NA	Solid	Direct Addition	
300-8902-4	B3M416	Total/NA	Solid	Direct Addition	
300-8902-5	B3M432	Total/NA	Solid	Direct Addition	
300-8902-6	B3M424	Total/NA	Solid	Direct Addition	
MB 300-16474/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16474/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8902-1 DU	B3M428	Total/NA	Solid	Direct Addition	

Prep Batch: 16666

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-1	B3M428	Total/NA	Solid	ExtChrAct	
300-8902-2	B3M448	Total/NA	Solid	ExtChrAct	
300-8902-3	B3M444	Total/NA	Solid	ExtChrAct	
300-8902-4	B3M416	Total/NA	Solid	ExtChrAct	
300-8902-5	B3M432	Total/NA	Solid	ExtChrAct	
300-8902-6	B3M424	Total/NA	Solid	ExtChrAct	
MB 300-16666/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16666/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8902-1 DU	B3M428	Total/NA	Solid	ExtChrAct	

Prep Batch: 16668

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-1	B3M428	Total/NA	Solid	ExtChr_LSC	
300-8902-2	B3M448	Total/NA	Solid	ExtChr_LSC	
300-8902-3	B3M444	Total/NA	Solid	ExtChr_LSC	
300-8902-4	B3M416	Total/NA	Solid	ExtChr_LSC	
300-8902-5	B3M432	Total/NA	Solid	ExtChr_LSC	
300-8902-6	B3M424	Total/NA	Solid	ExtChr_LSC	
MB 300-16668/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16668/2-A	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8902-1 DU	B3M428	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-1	B3M428	Total/NA	Solid	ExtChrAct	
300-8902-2	B3M448	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Rad (Continued)

Prep Batch: 16671 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8902-3	B3M444	Total/NA	Solid	ExtChrAct	
300-8902-4	B3M416	Total/NA	Solid	ExtChrAct	
300-8902-5	B3M432	Total/NA	Solid	ExtChrAct	
300-8902-6	B3M424	Total/NA	Solid	ExtChrAct	
MB 300-16671/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16671/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8902-1 DU	B3M428	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M428

Lab Sample ID: 300-8902-1
Date Collected: 12/03/18 13:25
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	379.89 g	379.89 g	16843	12/19/18 13:55	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.43 g	1.43 g	16848	12/19/18 16:33	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.04 g	1.04 g	16846	12/19/18 17:53	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.04 g	1.04 g	16885	12/20/18 16:48	DJ	TAL RCH

Client Sample ID: B3M448

Lab Sample ID: 300-8902-2
Date Collected: 12/03/18 12:51
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	381.61 g	381.61 g	16843	12/19/18 14:53	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.35 g	1.35 g	16848	12/19/18 16:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.31 g	1.31 g	16846	12/19/18 17:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.31 g	1.31 g	16885	12/20/18 18:52	DJ	TAL RCH

Client Sample ID: B3M444

Lab Sample ID: 300-8902-3
Date Collected: 12/03/18 10:50
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	366.74 g	366.74 g	16843	12/19/18 14:53	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.26 g	1.26 g	16848	12/19/18 16:34	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	0.96 g	0.96 g	16846	12/19/18 17:51	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	0.96 g	0.96 g	16885	12/20/18 19:54	DJ	TAL RCH

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Client Sample ID: B3M416

Lab Sample ID: 300-8902-4

Date Collected: 12/03/18 12:27
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	345.55 g	345.55 g	16843	12/19/18 14:53	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.17 g	1.17 g	16848	12/19/18 16:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.1 g	1.1 g	16846	12/19/18 17:52	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.1 g	1.1 g	16885	12/20/18 20:56	DJ	TAL RCH

Client Sample ID: B3M432

Lab Sample ID: 300-8902-5

Date Collected: 12/03/18 11:21
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	360.72 g	360.72 g	16843	12/19/18 14:54	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.39 g	1.39 g	16848	12/19/18 16:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.2 g	1.2 g	16846	12/19/18 17:52	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.2 g	1.2 g	16885	12/20/18 21:58	DJ	TAL RCH

Client Sample ID: B3M424

Lab Sample ID: 300-8902-6

Date Collected: 12/03/18 11:58
Matrix: Solid
Date Received: 12/04/18 10:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16480	12/08/18 08:55	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16474	12/07/18 14:10	TDA	TAL RCH
Total/NA	Analysis	901.1		1	376.2 g	376.2 g	16843	12/19/18 15:59	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16671	12/14/18 16:10	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.11 g	1.11 g	16848	12/19/18 16:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16666	12/14/18 15:30	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.19 g	1.19 g	16846	12/19/18 17:52	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16668	12/14/18 15:46	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.19 g	1.19 g	16885	12/20/18 23:00	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8902-1	B3M428	Solid	12/03/18 13:25	12/04/18 10:45
300-8902-2	B3M448	Solid	12/03/18 12:51	12/04/18 10:45
300-8902-3	B3M444	Solid	12/03/18 10:50	12/04/18 10:45
300-8902-4	B3M416	Solid	12/03/18 12:27	12/04/18 10:45
300-8902-5	B3M432	Solid	12/03/18 11:21	12/04/18 10:45
300-8902-6	B3M424	Solid	12/03/18 11:58	12/04/18 10:45

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-016	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 4	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M428	N/A	SOIL	DEC 03 2018	1325	✓	✓

8902

00-8902 COC

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69288 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-036	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 9	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M448	N/A	SOIL	DEC 03 2018	1251	✓	✓

8902

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69293 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

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CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-032	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Layback 8	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-50736	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8902

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M444	N/A	SOIL	DEC 03 2018	1050	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69292 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-004	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Layback 1	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8902

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M416	N/A	SOIL	DEC 03 2018	1027	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69285 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-020	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION: RTL Layback 5	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: HNF-N-507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M432	N/A	SOIL	DEC 03 2018	1121	✓	✓

8902

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69289 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-012	PAGE 1 OF 1
COLLECTOR: Chris Fulton /CHPRC	COMPANY CONTACT: SUMNER, LC	TELEPHONE NO.: 376-3922	PROJECT COORDINATOR: SUMNER, LC	REQUIRED TAT: 15 Days	
SAMPLING LOCATION: RTL Layback 3	PROJECT DESIGNATION: RTL LAYBACK SOIL AND EBL		SAF NO.: F18-062	ORIGINAL	
ICE CHEST NO.: N/A	FIELD LOGBOOK NO.: ~~HNF-N-~~ 507 36	ACTUAL SAMPLE DEPTH: 0"-6"	PURCHASE ORDER/CHARGE CODE: 304708	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

8902

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3M424	N/A	SOIL	DEC 03 2018	1158	✓	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton /CHPRC	DEC 03 2018 1440	SSU-1	DEC 03 2018 1440
SSU-1	DEC 04 2018 0700	Jeff Lucas /CHPRC	DEC 04 2018 0700
Jeff Lucas /CHPRC	DEC 04 2018 1045		DEC 04 2018 1045

SPECIAL INSTRUCTIONS
TRVL-19-001
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/13/2018 FSR ID = FSR69287 TRVL NUM = TRVL-19-001 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8902-1
SDG Number: RL8902-1

Login Number: 8902
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	False	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-8933-1
TestAmerica Sample Delivery Group: RL8933-1
Client Project/Site: F18-062

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Authorized for release by:
1/11/2019 11:41:02 AM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

LINKS

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Have a Question? Ask The Expert

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Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 300-8933-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-8933-1

Comments
No additional comments.

Receipt
The sample was received on 12/7/2018 9:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice.

RAD
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0382
Rev. Number: 0
Date Initiated: 12/31/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): F18-062

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1

SAMPLE NUMBERS: B3MMR5

SAMPLE MATRIX: SOIL

SDG NUM(S): RL8933-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The LCS recovery for PU241 is outside acceptance criteria at 222%. Sample results are greater than the MDC and less than the CRDL.

RESOLUTION

PROPOSED RESOLUTION: Please re-prep and re-run the sample.

FINAL RESOLUTION: See the Proposed Resolution.

SUBMITTED BY:

WORTHY, A 01/02/2019

ACCEPTED BY:

CUTSFORTH, EC 01/02/2019

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Client Sample ID: B3MMR5

Date Collected: 12/06/18 07:20
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8933-1

Matrix: Solid

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.040	U		0.0718	0.370	0.0499	pCi/g	12/19/18 14:24	12/24/18 12:14	1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0075	U	0.0470	0.0470	1.00	0.114	pCi/g	12/21/18 08:51	12/27/18 14:05	1
Pu-239/240	-0.019	U	0.0474	0.0476	1.00	0.140	pCi/g	12/21/18 08:51	12/27/18 14:05	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*44.9*		*30 - 105*	*12/21/18 08:51*	*12/27/18 14:05*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0564	U	0.0696	0.0701	1.00	0.111	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-233/234	0.00156	U	0.0266	0.0266	1.00	0.0802	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-235/236	-0.0016	U	0.0262	0.0262	1.00	0.0543	pCi/g	12/21/18 11:11	12/27/18 12:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*96.2*		*30 - 105*	*12/21/18 11:11*	*12/27/18 12:40*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	**5.46**		0.454	2.70	15.0	4.77	pCi/g	12/21/18 09:58	12/29/18 09:58	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*44.9*			*12/21/18 09:58*	*12/29/18 09:58*	*1*

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8933-1	B3MMR5	44.9
300-8933-1 DU	B3MMR5	43.1
LCS 300-16887/2-B	Lab Control Sample	100
MB 300-16887/1-A	Method Blank	48.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8933-1	B3MMR5	96.2
300-8933-1 DU	B3MMR5	95.3
LCS 300-16909/2-A	Lab Control Sample	76.5
MB 300-16909/1-A	Method Blank	84.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8933-1	B3MMR5	44.9
300-8933-1 DU	B3MMR5	43.1
LCS 300-16901/2-B	Lab Control Sample	100
MB 300-16901/1-A	Method Blank	48.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16831/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0196	U		0.0176	0.370	0.0537	pCi/g	12/19/18 14:24	12/24/18 12:13	1

Lab Sample ID: LCS 300-16831/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.523		0.192	0.370	0.0866	pCi/g	96	80 - 120		

Lab Sample ID: 300-8933-1 DU — **Client Sample ID: B3MMR5**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.040	U		0.00942	U y	0.0413	0.370	0.0521	pCi/g			325	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16909/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17013 — **Prep Batch: 16909**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00446	U	0.0280	0.0280	1.00	0.0682	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-233/234	0.00834	U	0.0281	0.0281	1.00	0.0713	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-235/236	-0.000557	U	0.0279	0.0279	1.00	0.0511	pCi/g	12/21/18 11:11	12/27/18 12:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.4*		*30 - 105*	*12/21/18 11:11*	*12/27/18 12:40*	*1*

Lab Sample ID: LCS 300-16909/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17013 — **Prep Batch: 16909**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.53	3.985		0.814	1.00	0.0912	pCi/g	113	80 - 120		
U-233/234			3.37	3.703		0.767	1.00	0.0745	pCi/g	110	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*76.5*		*30 - 105*

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17013

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16909

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0564	U		0.0200	U y	0.0348	1.00	0.0613	pCi/g			95	30
U-233/234	0.00156	U		-0.00489	U y	0.0246	1.00	0.0626	pCi/g			388	30
U-235/236	-0.0016	U		-0.000489	U y	0.0245	1.00	0.0449	pCi/g			105	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*95.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16887/1-A
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16887

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00549	U	0.0688	0.0688	1.00	0.149	pCi/g	12/21/18 08:51	12/27/18 14:05	1
Pu-239/240	0.0604	U	0.0973	0.0980	1.00	0.159	pCi/g	12/21/18 08:51	12/27/18 14:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*48.4*		*30 - 105*	*12/21/18 08:51*	*12/27/18 14:05*	*1*

Lab Sample ID: LCS 300-16887/2-B
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16887

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.75	5.152		0.954	1.00	0.0837	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*100*		*30 - 105*

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16887

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0075	U		-0.00661	U	0.0553	1.00	0.128	pCi/g			12	30
Pu-239/240	-0.019	U		0.0198	U y	0.0555	1.00	0.131	pCi/g			6883	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*43.1*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16901/1-A
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16901

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	3.279	U	0.344	3.14	15.0	5.91	pCi/g	12/21/18 09:58	12/29/18 07:54	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*48.4*			*12/21/18 09:58*	*12/29/18 07:54*	*1*

Lab Sample ID: LCS 300-16901/2-B
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16901

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			228	240.2		15.8	15.0	2.86	pCi/g	105	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*100*		

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16901

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	5.46			1.662	U y	2.84	15.0	5.52	pCi/g			107	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*43.1*		

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

General Chemistry

Analysis Batch: 16878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8933-1	B3MMR5	Total/NA	Solid	Moisture	
300-8933-1 DU	B3MMR5	Total/NA	Solid	Moisture	

Rad

Prep Batch: 16831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8933-1	B3MMR5	Total/NA	Solid	Direct Addition	
MB 300-16831/1-A	Method Blank	Total/NA	Solid	Direct Addition	
LCS 300-16831/2-A	Lab Control Sample	Total/NA	Solid	Direct Addition	
300-8933-1 DU	B3MMR5	Total/NA	Solid	Direct Addition	

Prep Batch: 16887

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8933-1	B3MMR5	Total/NA	Solid	ExtChrAct	
MB 300-16887/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16887/2-B	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8933-1 DU	B3MMR5	Total/NA	Solid	ExtChrAct	

Prep Batch: 16901

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8933-1	B3MMR5	Total/NA	Solid	ExtChr_LSC	
MB 300-16901/1-A	Method Blank	Total/NA	Solid	ExtChr_LSC	
LCS 300-16901/2-B	Lab Control Sample	Total/NA	Solid	ExtChr_LSC	
300-8933-1 DU	B3MMR5	Total/NA	Solid	ExtChr_LSC	

Prep Batch: 16909

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8933-1	B3MMR5	Total/NA	Solid	ExtChrAct	
MB 300-16909/1-A	Method Blank	Total/NA	Solid	ExtChrAct	
LCS 300-16909/2-A	Lab Control Sample	Total/NA	Solid	ExtChrAct	
300-8933-1 DU	B3MMR5	Total/NA	Solid	ExtChrAct	

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Client Sample ID: B3MMR5

Date Collected: 12/06/18 07:20
Date Received: 12/07/18 09:50

Lab Sample ID: 300-8933-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			16878	12/21/18 08:11	TDA	TAL RCH
Total/NA	Prep	Direct Addition					16831	12/19/18 14:24	TDA	TAL RCH
Total/NA	Analysis	901.1		1	374.31 g	374.31 g	16948	12/24/18 12:14	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16909	12/21/18 11:11	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.03 g	1.03 g	17013	12/27/18 12:40	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					16887	12/21/18 08:51	TDA	TAL RCH
Total/NA	Analysis	A-01-R		1	1.33 g	1.33 g	17010	12/27/18 14:05	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					16901	12/21/18 09:58	TDA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	1.33 g	1.33 g	17052	12/29/18 09:58	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL RCH
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
Direct Addition	Direct Addition of Sample	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8933-1	B3MMR5	Solid	12/06/18 07:20	12/07/18 09:50

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F18-062-080	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CH2RC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION RTL EBL - 3	PROJECT DESIGNATION RTL LAYBACK SOIL AND EBL		SAF NO. F18-062	ORIGINAL	
ICE CHEST NO. N/A	FIELD LOGBOOK NO. HNF-N-507 36	ACTUAL SAMPLE DEPTH N/A	PURCHASE ORDER/CHARGE CODE 304708	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO TestAmerica Incorporated, Richland	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE
N/A

PRESERVATION	None	None
HOLDING TIME	6 Months	6 Months
TYPE OF CONTAINER	G/P	G/P
NO. OF CONTAINER(S)	1	1
VOLUME	1L	60mL
SAMPLE ANALYSIS	GAMMA_GS: COMMON {Cobalt-60};	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3MMR5	N/A	SOIL	DEC 0 6 2018	0720	✓	✓

RL0933-1

300 3933 COC

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson /CH2RC	DEC 0 6 2018 1440	SSU-1	DEC 0 6 2018 1440
SSU-1	DEC 0 7 2018 0700	Jeff Lucas /CHPRC	DEC 0 7 2018 0700
Jeff Lucas /CHPRC	DEC 0 7 2018 0950	Charlotte Bughers CB-TARL	DEC 0 7 2018 0950

SPECIAL INSTRUCTIONS
TRVL-19-018
(1) PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; PU241_IE_LSC: COMMON {Plutonium-241};

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 11/15/2018 FSR ID = FSR71862 TRVL NUM = TRVL-19-018 A-6003-618 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8933-1
SDG Number: RL8933-1

Login Number: 8933
List Number: 1
Creator: Vitte, Suzi E

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix E – Data Validation Reports

This appendix contains the data validation reports documenting the Level C validation of data collected within the six survey units as identified in the *RTL Disposition Program Final Status Survey Plan* (Bunn et al. 2018). The reports also contain validation of the non-radiological analyses which are discussed in the *Research Technology Laboratory (RTL) Disposition Program Final Verification Sampling Report for Non-radiological Analytes* (Golovich et al. 2019).

References

Bunn AL, JK Snelling, and AM Gorton. 2018. *RTL Disposition Program Final Status Survey Plan.* S740277-PLAN-14, Pacific Northwest National Laboratory. Richland, Washington.

Golovich EC, AL Bunn, FH Biebesheimer, and JK Snelling. 2019. *Research Technology Laboratory (RTL) Disposition Program Final Verification Sampling Report for Non-Radiological Analytes*. S740277-RPT-06, Pacific Northwest National Laboratory, Richland, Washington.

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01/22/2019	
3. Project No.	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-012		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
01/22/2019 Date; Scot Fitzgerald Organization Manager (optional) (print and sign)	Date; Reviewer/Point of Contact (print and sign); Author/Originator (print and sign)	1/23/19 ~~01/17/2019~~ Date; Reviewer/Point of Contact (print and sign); SLF 1/22/19 Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	On page 55 under SDG SL32072-1 the LCS failure for bis(2 chloro-1-methylethyl) ether and Benzo[g,h,i]perylene are not discussed. In addition, the Benzo[k]fluoranthene LCS is listed as failed when it is passing.		Correct narrative and flagging summary.	Y		Closed
2	On page 233 under SDG SL32015-1 samples are flagged J+ for Mn spike failure. The parent sample for Mn was >4X the spike concentration so the J+ flag is not warranted (this is correct in checklist notes pg 243.		Correct narrative and flagging summary.	Y		Closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	1/22/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-012 VSR19-012 Rev. 1		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/22/2019 Jadie Kaas Date Organization Manager (optional) (print and sign)	Reviewer/Point of Contact (print and sign) Date Author/Originator (print and sign)	1/23/2019 Jadie Kaas Date Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No other issues noted than the two comments reported on Scot Fitzgerald's RCR dated 1/22/19					Closed

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-012
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-16-2019**

Technical Review By: Ellen McEntee **Date: 01-17-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 01-23-2019**

Mary Donivan
Quality Assurance Manager

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Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Groups (SDGs) SL32015-1, SL32017-1, SL32070-1, SL32072-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 prepared by TestAmerica. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KFH5	11/26/18	Soil	C	8260C
B3KFJ4	11/26/18	Soil	C	8260C
B3KFR1	11/26/18	Soil	C	8260C
B3KFR4	11/26/18	Soil	C	8260C
B3KFN3	11/26/18	Soil	C	8260C
B3L193	11/26/18	Soil	C	8260C
B3KFH8	11/26/18	Soil	C	8260C
B3KFJ1	11/26/18	Soil	C	8260C
B3L1B0	11/26/18	Soil	C	8260C
B3KFH2	11/26/18	Soil	C	8260C
B3KFL2	11/26/18	Soil	C	8260C
B3KFN6	11/26/18	Soil	C	8260C
B3KFF9	11/26/18	Soil	C	8260C
B3KFK9	11/26/18	Soil	C	8260C
B3KFL8	11/26/18	Soil	C	8260C
B3KFN0	11/26/18	Soil	C	8260C
B3KFF6	11/28/18	Soil	C	8260C
B3KFK6	11/28/18	Soil	C	8260C
B3KFK3	11/28/18	Soil	C	8260C
B3KFP5	11/28/18	Soil	C	8260C
B3KFM4	11/28/18	Soil	C	8260C
B3KFL5	11/28/18	Soil	C	8260C
B3KFP8	11/28/18	Soil	C	8260C
B3KFM7	11/28/18	Soil	C	8260C
B3L196	11/28/18	Soil	C	8260C
B3KFJ7	11/28/18	Soil	C	8260C
B3KFP2	11/28/18	Soil	C	8260C
B3KFK0	11/28/18	Soil	C	8260C
B3KFF3	11/28/18	Soil	C	8260C
B3KFM1	11/28/18	Soil	C	8260C
B3KFN9	11/28/18	Soil	C	8260C

B3L1B1	11/28/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved with the following exceptions.

For SDG SL32070-1, samples B3KLF5, B3KFP8, B3KFM7, B3L196, B3KFJ7, B3KFP2, and B3KFK0 were extracted 6 to 8 hours past the 14 day holding time. Based on professional judgment, data should not be qualified as a result.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32017-1 the MS recovery for bromomethane associated with batch 404683 was above the upper acceptance limit. The bromomethane result for sample B3KLFL8 was a non-detect and should not be qualified as a result. The MS and MSD recoveries for bromomethane and vinyl chloride and the MS recovery for 1,2-dichloropropane associated with batch 404776 were above the upper acceptance limit. The 1,2-dichloropropane, bromomethane and vinyl chloride results for sample B3KFN0 were non-detects and should not be qualified as a result.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

LCS/LCSD Samples

All LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDL for methylene chloride was met. CRDLs for all other VOC target analytes were not provided in the SAP.

- **Completeness**

SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
VOCs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL32015-1: B3KFH5, B3KFJ4, B3KFR1, B3KFR4, B3KFN3, B3L193, B3KFH8, B3KFJ1, B3L1B0, B3KFH2, B3KFL2, B3KFN6, B3KFF9, B3KFK9,					
SDG SL32017-1: B3KFL8, B3KFN0,					
SDG SL32070-1: B3KFF6, B3KFK6, B3KFK3, B3KFP5, B3KFM4, B3KFL5, B3KFP8, B3KFM7, B3L196, B3KFJ7, B3KFP2, B3KFK0,					
SDG SL32072-1: B3KFF3, B3KFM1, B3KFN9, B3L1B1,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL32017-1: (batch 404683) MS bromomethane 133%;
(batch 404776) 1,2-dichlorpropane 138% (MS); bromomethane 133%/135%;
vinyl chloride 132%/133%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SDG SL32070-1: Samples B3KFL5, B3KFP8, B3KFM7, B3L196, B3KFJ7, B3KFP2, B3KFK0 were prepped 6 to 8 hours past HT.

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL for methylene chloride was met. No other CRDLs for VOC were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-404776/8
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/09/18 15:53	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/09/18 15:53	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/09/18 15:53	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/09/18 15:53	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/09/18 15:53	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/09/18 15:53	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/09/18 15:53	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/09/18 15:53	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/09/18 15:53	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/09/18 15:53	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/09/18 15:53	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/09/18 15:53	1
Acetone	6.5	U	20	6.5	ug/Kg			12/09/18 15:53	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/09/18 15:53	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/09/18 15:53	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/09/18 15:53	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/09/18 15:53	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/09/18 15:53	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/09/18 15:53	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/09/18 15:53	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/09/18 15:53	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/09/18 15:53	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/09/18 15:53	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/09/18 15:53	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/09/18 15:53	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/09/18 15:53	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/09/18 15:53	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/09/18 15:53	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/09/18 15:53	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/09/18 15:53	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/09/18 15:53	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/09/18 15:53	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/09/18 15:53	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/09/18 15:53	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl alcohol	*17.4*	*J*	*ug/Kg*		*4.47*	*67-63-0*		*12/09/18 15:53*	*1*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/09/18 15:53*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*		*12/09/18 15:53*	*1*
4-Bromofluorobenzene (Surr)	*111*		*59 - 150*		*12/09/18 15:53*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/09/18 15:53*	*1*
Toluene-d8 (Surr)	*98*		*74 - 135*		*12/09/18 15:53*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-404776/5
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	52.1		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	48.5		ug/Kg		97	52 - 140
1,1,2-Trichloroethane	50.0	50.6		ug/Kg		101	79 - 122
1,1-Dichloroethane	50.0	48.6		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	50.7		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	45.7		ug/Kg		91	68 - 128
1,2-Dichloroethene, Total	100	103		ug/Kg		103	79 - 121
1,2-Dichloropropane	50.0	60.1		ug/Kg		120	80 - 126
2-Butanone (MEK)	50.0	51.9		ug/Kg		104	41 - 140
2-Hexanone	50.0	45.5		ug/Kg		91	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	40.6		ug/Kg		81	39 - 140
Benzene	50.0	58.0		ug/Kg		116	80 - 120
Bromodichloromethane	50.0	50.8		ug/Kg		102	78 - 124
Bromoform	50.0	51.7		ug/Kg		103	67 - 135
Bromomethane	50.0	58.5		ug/Kg		117	61 - 132
Carbon disulfide	50.0	51.9		ug/Kg		104	74 - 124
Carbon tetrachloride	50.0	53.6		ug/Kg		107	68 - 130
Chlorobenzene	50.0	49.4		ug/Kg		99	80 - 120
Chloroethane	50.0	55.3		ug/Kg		111	73 - 129
Chloroform	50.0	52.2		ug/Kg		104	78 - 120
Chloromethane	50.0	59.1		ug/Kg		118	69 - 123
cis-1,3-Dichloropropene	50.0	59.6		ug/Kg		119	78 - 127
Dibromochloromethane	50.0	49.2		ug/Kg		98	77 - 126
Ethylbenzene	50.0	48.3		ug/Kg		97	79 - 126
Methylene Chloride	50.0	49.0		ug/Kg		98	76 - 120
Styrene	50.0	49.9		ug/Kg		100	80 - 129
Tetrachloroethene	50.0	52.6		ug/Kg		105	76 - 126
Toluene	50.0	60.3		ug/Kg		121	76 - 136
trans-1,3-Dichloropropene	50.0	51.7		ug/Kg		103	77 - 136
Trichloroethene	50.0	52.4		ug/Kg		105	66 - 130
Vinyl chloride	50.0	58.5		ug/Kg		117	56 - 134
Xylenes, Total	100	99.1		ug/Kg		99	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*111*		*74 - 135*

Lab Sample ID: LCSD 160-404776/6
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	51.2		ug/Kg		102	52 - 140	5	20
1,1,2-Trichloroethane	50.0	43.0		ug/Kg		86	79 - 122	16	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-404776/6
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	52.3		ug/Kg		105	80 - 120	7	20
1,1-Dichloroethene	50.0	55.1		ug/Kg		110	71 - 126	8	20
1,2-Dichloroethane	50.0	48.1		ug/Kg		96	68 - 128	5	20
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121	9	20
1,2-Dichloropropane	50.0	54.9		ug/Kg		110	80 - 126	9	20
2-Butanone (MEK)	50.0	49.2		ug/Kg		98	41 - 140	5	20
2-Hexanone	50.0	40.5		ug/Kg		81	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)	50.0	41.6		ug/Kg		83	67 - 130	4	20
Acetone	50.0	45.7		ug/Kg		91	39 - 140	12	20
Benzene	50.0	54.5		ug/Kg		109	80 - 120	6	20
Bromodichloromethane	50.0	49.8		ug/Kg		100	78 - 124	2	20
Bromoform	50.0	47.2		ug/Kg		94	67 - 135	9	20
Bromomethane	50.0	63.3		ug/Kg		127	61 - 132	8	20
Carbon disulfide	50.0	56.6		ug/Kg		113	74 - 124	9	20
Carbon tetrachloride	50.0	52.0		ug/Kg		104	68 - 130	3	20
Chlorobenzene	50.0	48.3		ug/Kg		97	80 - 120	2	20
Chloroethane	50.0	59.6		ug/Kg		119	73 - 129	8	20
Chloroform	50.0	49.9		ug/Kg		100	78 - 120	5	20
Chloromethane	50.0	62.9	o	ug/Kg		126	69 - 123	6	20
cis-1,3-Dichloropropene	50.0	55.2		ug/Kg		110	78 - 127	8	20
Dibromochloromethane	50.0	42.5		ug/Kg		85	77 - 126	15	20
Ethylbenzene	50.0	47.8		ug/Kg		96	79 - 126	1	20
Methylene Chloride	50.0	54.4		ug/Kg		109	76 - 120	11	20
Styrene	50.0	50.6		ug/Kg		101	80 - 129	1	20
Tetrachloroethene	50.0	45.2		ug/Kg		90	76 - 126	15	20
Toluene	50.0	52.2		ug/Kg		104	76 - 136	14	20
trans-1,3-Dichloropropene	50.0	45.7		ug/Kg		91	77 - 136	12	20
Trichloroethene	50.0	52.1		ug/Kg		104	66 - 130	1	20
Vinyl chloride	50.0	63.9		ug/Kg		128	56 - 134	9	20
Xylenes, Total	100	104		ug/Kg		104	79 - 132	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*92*		*74 - 135*

Lab Sample ID: 160-32015-1 MS
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.42	U	46.5	49.0		ug/Kg	☼	105	80 - 120
1,1,2,2-Tetrachloroethane	1.9	U	46.5	44.9		ug/Kg	☼	97	78 - 120
1,1,2-Trichloroethane	1.1	U	46.5	46.0		ug/Kg	☼	99	80 - 120
1,1-Dichloroethane	0.38	U	46.5	49.7		ug/Kg	☼	107	80 - 120
1,1-Dichloroethene	1.6	U	46.5	52.6		ug/Kg	☼	113	78 - 121
1,2-Dichloroethane	0.85	U	46.5	44.8		ug/Kg	☼	97	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32015-1 MS
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.3	U	92.9	105		ug/Kg	☼	113	80 - 120
1,2-Dichloropropane	0.59	U	46.5	51.4		ug/Kg	☼	111	80 - 120
2-Butanone (MEK)	1.9	U	46.5	44.8		ug/Kg	☼	96	69 - 124
2-Hexanone	3.3	U	46.5	38.2		ug/Kg	☼	82	62 - 118
4-Methyl-2-pentanone (MIBK)	2.5	U	46.5	43.0		ug/Kg	☼	93	73 - 125
Acetone	6.3	U	46.5	40.8		ug/Kg	☼	88	54 - 139
Benzene	0.25	U	46.5	50.9		ug/Kg	☼	110	80 - 120
Bromodichloromethane	0.48	U	46.5	46.3		ug/Kg	☼	100	80 - 120
Bromoform	1.9	U	46.5	47.0		ug/Kg	☼	101	80 - 125
Bromomethane	2.3	U T	46.5	60.4	T	ug/Kg	☼	130	70 - 126
Carbon disulfide	0.67	U	46.5	52.5		ug/Kg	☼	113	79 - 121
Carbon tetrachloride	0.50	U	46.5	47.9		ug/Kg	☼	103	80 - 120
Chlorobenzene	0.79	U	46.5	45.9		ug/Kg	☼	99	80 - 120
Chloroethane	1.9	U	46.5	58.9		ug/Kg	☼	127	64 - 133
Chloroform	0.37	U	46.5	47.1		ug/Kg	☼	101	80 - 120
Chloromethane	0.63	U o T	46.5	58.8	T	ug/Kg	☼	127	75 - 120
cis-1,3-Dichloropropene	2.1	U	46.5	51.2		ug/Kg	☼	110	80 - 120
Dibromochloromethane	1.2	U	46.5	44.4		ug/Kg	☼	96	80 - 120
Ethylbenzene	0.67	U	46.5	46.7		ug/Kg	☼	100	80 - 120
Methylene Chloride	1.5	U	46.5	50.2		ug/Kg	☼	108	77 - 123
Styrene	1.9	U	46.5	50.0		ug/Kg	☼	108	80 - 120
Tetrachloroethene	0.55	U	46.5	50.2		ug/Kg	☼	108	80 - 120
Toluene	2.4	U	46.5	55.1		ug/Kg	☼	119	80 - 124
trans-1,3-Dichloropropene	1.7	U	46.5	48.2		ug/Kg	☼	104	80 - 122
Trichloroethene	0.38	U	46.5	50.4		ug/Kg	☼	109	79 - 120
Vinyl chloride	0.42	U T	46.5	59.7	T	ug/Kg	☼	129	71 - 120
Xylenes, Total	0.83	U	92.9	97.8		ug/Kg	☼	105	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*67 - 132*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.42	U	56.1	57.9		ug/Kg	☼	103	80 - 120	17	20
1,1,2,2-Tetrachloroethane	1.9	U	56.1	50.6		ug/Kg	☼	90	78 - 120	12	20
1,1,2-Trichloroethane	1.1	U	56.1	53.3		ug/Kg	☼	95	80 - 120	15	20
1,1-Dichloroethane	0.38	U	56.1	59.1		ug/Kg	☼	105	80 - 120	17	20
1,1-Dichloroethene	1.6	U	56.1	62.5		ug/Kg	☼	112	78 - 121	17	20
1,2-Dichloroethane	0.85	U	56.1	51.3		ug/Kg	☼	91	78 - 117	13	20
1,2-Dichloroethene, Total	1.3	U	112	127		ug/Kg	☼	113	80 - 120	19	20
1,2-Dichloropropane	0.59	U	56.1	62.0		ug/Kg	☼	111	80 - 120	19	20
2-Butanone (MEK)	1.9	U	56.1	49.9		ug/Kg	☼	89	69 - 124	11	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.3	U	56.1	47.1	y	ug/Kg	☼	84	62 - 118	21	20
4-Methyl-2-pentanone (MIBK)	2.5	U	56.1	48.7		ug/Kg	☼	87	73 - 125	12	20
Acetone	6.3	U	56.1	47.4		ug/Kg	☼	84	54 - 139	15	20
Benzene	0.25	U	56.1	61.2		ug/Kg	☼	109	80 - 120	18	20
Bromodichloromethane	0.48	U	56.1	54.4		ug/Kg	☼	97	80 - 120	16	20
Bromoform	1.9	U	56.1	59.4	y	ug/Kg	☼	106	80 - 125	23	20
Bromomethane	2.3	U T	56.1	72.5	T	ug/Kg	☼	129	70 - 126	18	20
Carbon disulfide	0.67	U	56.1	63.3		ug/Kg	☼	113	79 - 121	19	20
Carbon tetrachloride	0.50	U	56.1	56.8		ug/Kg	☼	101	80 - 120	17	20
Chlorobenzene	0.79	U	56.1	55.3		ug/Kg	☼	99	80 - 120	19	20
Chloroethane	1.9	U	56.1	68.9		ug/Kg	☼	123	64 - 133	16	20
Chloroform	0.37	U	56.1	55.7		ug/Kg	☼	99	80 - 120	17	20
Chloromethane	0.63	U o T	56.1	69.8	T	ug/Kg	☼	125	75 - 120	17	20
cis-1,3-Dichloropropene	2.1	U	56.1	61.6		ug/Kg	☼	110	80 - 120	18	20
Dibromochloromethane	1.2	U	56.1	52.5		ug/Kg	☼	94	80 - 120	17	20
Ethylbenzene	0.67	U	56.1	55.3		ug/Kg	☼	99	80 - 120	17	20
Methylene Chloride	1.5	U	56.1	60.8		ug/Kg	☼	109	77 - 123	19	20
Styrene	1.9	U	56.1	63.9	y	ug/Kg	☼	114	80 - 120	24	20
Tetrachloroethene	0.55	U	56.1	55.4		ug/Kg	☼	99	80 - 120	10	20
Toluene	2.4	U	56.1	66.3		ug/Kg	☼	118	80 - 124	19	20
trans-1,3-Dichloropropene	1.7	U	56.1	54.4		ug/Kg	☼	97	80 - 122	12	20
Trichloroethene	0.38	U	56.1	60.8		ug/Kg	☼	108	79 - 120	19	20
Vinyl chloride	0.42	U T	56.1	72.1	T	ug/Kg	☼	129	71 - 120	19	20
Xylenes, Total	0.83	U	112	122	y	ug/Kg	☼	109	80 - 120	22	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*94*		*53 - 143*
Toluene-d8 (Surr)	*94*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32015-1	B3KFH5	93	124	92	102
160-32015-1 MS	B3KFH5	92	103	98	104
160-32015-1 MSD	B3KFH5	87	101	94	94
160-32015-2	B3KFJ4	89	106	92	126
160-32015-3	B3KFR1	100	102	104	99
160-32015-4	B3KFR4	99	108	101	109
160-32015-5	B3KFN3	105	103	106	92
160-32015-6	B3L193	97	103	112	100
160-32015-7	B3KFH8	100	126	101	99
160-32015-8	B3KFJ1	108	117	105	98
160-32015-9	B3L1B0	110	126	108	107
160-32015-10	B3KFH2	106	104	101	118
160-32015-17	B3KFL2	98	101	94	116
160-32015-18	B3KFN6	103	108	97	103
160-32015-19	B3KFF9	102	112	113	111
160-32015-20	B3KFK9	115	109	111	109

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-404776/5	Lab Control Sample	90	105	105	111
LCSD 160-404776/6	Lab Control Sample Dup	93	104	99	92
MB 160-404776/8	Method Blank	95	111	102	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32015-1	B3KFH5	67	76	73	64	73	80
160-32015-1 MS	B3KFH5	75	76	77	73	77	81
160-32015-1 MSD	B3KFH5	74	76	77	74	76	81
160-32015-2	B3KFJ4	76	85	85	73	87	90
160-32015-3	B3KFR1	72	83	82	70	84	85

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-404683/7
Matrix: Solid
Analysis Batch: 404683

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/08/18 14:03	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/08/18 14:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/08/18 14:03	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/08/18 14:03	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/08/18 14:03	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/08/18 14:03	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/08/18 14:03	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/08/18 14:03	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/08/18 14:03	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/08/18 14:03	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/08/18 14:03	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/08/18 14:03	1
Acetone	6.5	U	20	6.5	ug/Kg			12/08/18 14:03	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/08/18 14:03	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/08/18 14:03	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/08/18 14:03	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/08/18 14:03	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/08/18 14:03	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/08/18 14:03	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/08/18 14:03	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/08/18 14:03	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/08/18 14:03	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/08/18 14:03	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/08/18 14:03	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/08/18 14:03	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/08/18 14:03	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/08/18 14:03	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/08/18 14:03	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/08/18 14:03	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/08/18 14:03	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/08/18 14:03	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/08/18 14:03	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/08/18 14:03	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/08/18 14:03	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/08/18 14:03*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*		*12/08/18 14:03*	*1*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*		*12/08/18 14:03*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 143*		*12/08/18 14:03*	*1*
Toluene-d8 (Surr)	*105*		*74 - 135*		*12/08/18 14:03*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-404683/4
Matrix: Solid
Analysis Batch: 404683

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	54.3		ug/Kg		109	71 - 127
1,1,2,2-Tetrachloroethane	50.0	54.2		ug/Kg		108	52 - 140
1,1,2-Trichloroethane	50.0	50.1		ug/Kg		100	79 - 122
1,1-Dichloroethane	50.0	52.8		ug/Kg		106	80 - 120
1,1-Dichloroethene	50.0	53.3		ug/Kg		107	71 - 126
1,2-Dichloroethane	50.0	53.6		ug/Kg		107	68 - 128
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121
1,2-Dichloropropane	50.0	53.7		ug/Kg		107	80 - 126
2-Butanone (MEK)	50.0	54.1		ug/Kg		108	41 - 140
2-Hexanone	50.0	45.3		ug/Kg		91	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	46.6		ug/Kg		93	67 - 130
Acetone	50.0	53.8		ug/Kg		108	39 - 140
Benzene	50.0	53.3		ug/Kg		107	80 - 120
Bromodichloromethane	50.0	52.4		ug/Kg		105	78 - 124
Bromoform	50.0	53.3		ug/Kg		107	67 - 135
Bromomethane	50.0	62.1		ug/Kg		124	61 - 132
Carbon disulfide	50.0	53.4		ug/Kg		107	74 - 124
Carbon tetrachloride	50.0	53.7		ug/Kg		107	68 - 130
Chlorobenzene	50.0	49.2		ug/Kg		98	80 - 120
Chloroethane	50.0	57.3		ug/Kg		115	73 - 129
Chloroform	50.0	51.1		ug/Kg		102	78 - 120
Chloromethane	50.0	60.5		ug/Kg		121	69 - 123
cis-1,3-Dichloropropene	50.0	56.2		ug/Kg		112	78 - 127
Dibromochloromethane	50.0	50.4		ug/Kg		101	77 - 126
Ethylbenzene	50.0	49.4		ug/Kg		99	79 - 126
Methylene Chloride	50.0	53.3		ug/Kg		107	76 - 120
Styrene	50.0	51.2		ug/Kg		102	80 - 129
Tetrachloroethene	50.0	50.2		ug/Kg		100	76 - 126
Toluene	50.0	54.1		ug/Kg		108	76 - 136
trans-1,3-Dichloropropene	50.0	51.9		ug/Kg		104	77 - 136
Trichloroethene	50.0	51.8		ug/Kg		104	66 - 130
Vinyl chloride	50.0	60.8		ug/Kg		122	56 - 134
Xylenes, Total	100	101		ug/Kg		101	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-404683/5
Matrix: Solid
Analysis Batch: 404683

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	53.0		ug/Kg		106	71 - 127	3	20
1,1,2,2-Tetrachloroethane	50.0	48.2		ug/Kg		96	52 - 140	12	20
1,1,2-Trichloroethane	50.0	47.2		ug/Kg		94	79 - 122	6	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-404683/5
Matrix: Solid
Analysis Batch: 404683

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	52.1		ug/Kg		104	80 - 120	1	20
1,1-Dichloroethene	50.0	53.7		ug/Kg		107	71 - 126	1	20
1,2-Dichloroethane	50.0	48.7		ug/Kg		97	68 - 128	10	20
1,2-Dichloroethene, Total	100	108		ug/Kg		108	79 - 121	1	20
1,2-Dichloropropane	50.0	52.6		ug/Kg		105	80 - 126	2	20
2-Butanone (MEK)	50.0	48.9		ug/Kg		98	41 - 140	10	20
2-Hexanone	50.0	43.5		ug/Kg		87	63 - 136	4	20
4-Methyl-2-pentanone (MIBK)	50.0	43.1		ug/Kg		86	67 - 130	8	20
Acetone	50.0	48.6		ug/Kg		97	39 - 140	10	20
Benzene	50.0	53.7		ug/Kg		107	80 - 120	1	20
Bromodichloromethane	50.0	50.4		ug/Kg		101	78 - 124	4	20
Bromoform	50.0	48.8		ug/Kg		98	67 - 135	9	20
Bromomethane	50.0	61.0		ug/Kg		122	61 - 132	2	20
Carbon disulfide	50.0	54.8		ug/Kg		110	74 - 124	3	20
Carbon tetrachloride	50.0	53.1		ug/Kg		106	68 - 130	1	20
Chlorobenzene	50.0	50.0		ug/Kg		100	80 - 120	2	20
Chloroethane	50.0	58.8		ug/Kg		118	73 - 129	3	20
Chloroform	50.0	50.7		ug/Kg		101	78 - 120	1	20
Chloromethane	50.0	58.6		ug/Kg		117	69 - 123	3	20
cis-1,3-Dichloropropene	50.0	55.2		ug/Kg		110	78 - 127	2	20
Dibromochloromethane	50.0	46.9		ug/Kg		94	77 - 126	7	20
Ethylbenzene	50.0	50.3		ug/Kg		101	79 - 126	2	20
Methylene Chloride	50.0	52.0		ug/Kg		104	76 - 120	2	20
Styrene	50.0	52.5		ug/Kg		105	80 - 129	3	20
Tetrachloroethene	50.0	50.1		ug/Kg		100	76 - 126	0	20
Toluene	50.0	55.7		ug/Kg		111	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	50.8		ug/Kg		102	77 - 136	2	20
Trichloroethene	50.0	51.7		ug/Kg		103	66 - 130	0	20
Vinyl chloride	50.0	60.7		ug/Kg		121	56 - 134	0	20
Xylenes, Total	100	103		ug/Kg		103	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*103*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: 160-32017-1 MS
Matrix: Soil
Analysis Batch: 404683

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 404685

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.47	U	45.3	50.7		ug/Kg	☼	112	80 - 120
1,1,2,2-Tetrachloroethane	2.1	U	45.3	44.8		ug/Kg	☼	99	78 - 120
1,1,2-Trichloroethane	1.3	U	45.3	47.1		ug/Kg	☼	104	80 - 120
1,1-Dichloroethane	0.43	U	45.3	50.1		ug/Kg	☼	111	80 - 120
1,1-Dichloroethene	1.8	U	45.3	50.7		ug/Kg	☼	112	78 - 121
1,2-Dichloroethane	0.96	U	45.3	48.6		ug/Kg	☼	107	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32017-1 MS
Matrix: Soil
Analysis Batch: 404683

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 404685

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.5	U	90.6	101		ug/Kg	☼	111	80 - 120
1,2-Dichloropropane	0.66	U	45.3	49.4		ug/Kg	☼	109	80 - 120
2-Butanone (MEK)	2.1	U	45.3	46.5		ug/Kg	☼	103	69 - 124
2-Hexanone	3.7	U	45.3	39.7		ug/Kg	☼	88	62 - 118
4-Methyl-2-pentanone (MIBK)	2.8	U	45.3	41.0		ug/Kg	☼	90	73 - 125
Acetone	7.1	U	45.3	46.0		ug/Kg	☼	101	54 - 139
Benzene	0.28	U	45.3	49.8		ug/Kg	☼	110	80 - 120
Bromodichloromethane	0.55	U	45.3	48.3		ug/Kg	☼	107	80 - 120
Bromoform	2.1	U	45.3	49.0		ug/Kg	☼	108	80 - 125
Bromomethane	2.6	U T	45.3	60.4	T	ug/Kg	☼	133	70 - 126
Carbon disulfide	0.76	U	45.3	51.5		ug/Kg	☼	114	79 - 121
Carbon tetrachloride	0.56	U	45.3	50.3		ug/Kg	☼	111	80 - 120
Chlorobenzene	0.89	U	45.3	46.4		ug/Kg	☼	102	80 - 120
Chloroethane	2.2	U	45.3	56.6		ug/Kg	☼	125	64 - 133
Chloroform	0.42	U	45.3	47.9		ug/Kg	☼	106	80 - 120
Chloromethane	0.72	U T	45.3	56.4	T	ug/Kg	☼	124	75 - 120
cis-1,3-Dichloropropene	2.3	U	45.3	51.4		ug/Kg	☼	113	80 - 120
Dibromochloromethane	1.4	U	45.3	45.5		ug/Kg	☼	100	80 - 120
Ethylbenzene	0.76	U	45.3	47.5		ug/Kg	☼	105	80 - 120
Methylene Chloride	1.7	U	45.3	48.4		ug/Kg	☼	107	77 - 123
Styrene	2.2	U	45.3	48.7		ug/Kg	☼	107	80 - 120
Tetrachloroethene	0.62	U	45.3	46.6		ug/Kg	☼	103	80 - 120
Toluene	2.8	U	45.3	53.2		ug/Kg	☼	117	80 - 124
trans-1,3-Dichloropropene	1.9	U	45.3	47.7		ug/Kg	☼	105	80 - 122
Trichloroethene	0.43	U	45.3	51.4		ug/Kg	☼	113	79 - 120
Vinyl chloride	0.47	U T	45.3	57.1	T	ug/Kg	☼	126	71 - 120
Xylenes, Total	0.94	U	90.6	94.8		ug/Kg	☼	105	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*109*		*59 - 150*
Dibromofluoromethane (Surr)	*104*		*53 - 143*
Toluene-d8 (Surr)	*107*		*74 - 135*

Lab Sample ID: 160-32017-1 MSD
Matrix: Soil
Analysis Batch: 404683

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 404685

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.47	U	53.2	58.4		ug/Kg	☼	110	80 - 120	14	20
1,1,2,2-Tetrachloroethane	2.1	U	53.2	48.9		ug/Kg	☼	92	78 - 120	9	20
1,1,2-Trichloroethane	1.3	U	53.2	50.8		ug/Kg	☼	96	80 - 120	8	20
1,1-Dichloroethane	0.43	U	53.2	56.3		ug/Kg	☼	106	80 - 120	12	20
1,1-Dichloroethene	1.8	U	53.2	58.1		ug/Kg	☼	109	78 - 121	14	20
1,2-Dichloroethane	0.96	U	53.2	52.5		ug/Kg	☼	99	78 - 117	8	20
1,2-Dichloroethene, Total	1.5	U	106	115		ug/Kg	☼	108	80 - 120	13	20
1,2-Dichloropropane	0.66	U	53.2	58.4		ug/Kg	☼	110	80 - 120	17	20
2-Butanone (MEK)	2.1	U	53.2	49.3		ug/Kg	☼	93	69 - 124	6	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32017-1 MSD
Matrix: Soil
Analysis Batch: 404683

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 404685

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.7	U	53.2	44.3		ug/Kg	☼	83	62 - 118	11	20
4-Methyl-2-pentanone (MIBK)	2.8	U	53.2	46.5		ug/Kg	☼	87	73 - 125	13	20
Acetone	7.1	U	53.2	53.8		ug/Kg	☼	101	54 - 139	16	20
Benzene	0.28	U	53.2	57.6		ug/Kg	☼	108	80 - 120	14	20
Bromodichloromethane	0.55	U	53.2	53.7		ug/Kg	☼	101	80 - 120	11	20
Bromoform	2.1	U	53.2	55.0		ug/Kg	☼	104	80 - 125	12	20
Bromomethane	2.6	U T	53.2	67.9	T	ug/Kg	☼	128	70 - 126	12	20
Carbon disulfide	0.76	U	53.2	59.0		ug/Kg	☼	111	79 - 121	13	20
Carbon tetrachloride	0.56	U	53.2	56.0		ug/Kg	☼	105	80 - 120	11	20
Chlorobenzene	0.89	U	53.2	52.3		ug/Kg	☼	98	80 - 120	12	20
Chloroethane	2.2	U	53.2	68.0		ug/Kg	☼	128	64 - 133	18	20
Chloroform	0.42	U	53.2	53.8		ug/Kg	☼	101	80 - 120	12	20
Chloromethane	0.72	U T	53.2	64.9	T	ug/Kg	☼	122	75 - 120	14	20
cis-1,3-Dichloropropene	2.3	U	53.2	58.1		ug/Kg	☼	109	80 - 120	12	20
Dibromochloromethane	1.4	U	53.2	51.2		ug/Kg	☼	96	80 - 120	12	20
Ethylbenzene	0.76	U	53.2	52.9		ug/Kg	☼	99	80 - 120	11	20
Methylene Chloride	1.7	U	53.2	56.9		ug/Kg	☼	107	77 - 123	16	20
Styrene	2.2	U	53.2	54.7		ug/Kg	☼	103	80 - 120	12	20
Tetrachloroethene	0.62	U	53.2	52.3		ug/Kg	☼	98	80 - 120	12	20
Toluene	2.8	U	53.2	59.5		ug/Kg	☼	112	80 - 124	11	20
trans-1,3-Dichloropropene	1.9	U	53.2	54.0		ug/Kg	☼	102	80 - 122	12	20
Trichloroethene	0.43	U	53.2	57.7		ug/Kg	☼	108	79 - 120	12	20
Vinyl chloride	0.47	U T	53.2	67.3	T	ug/Kg	☼	126	71 - 120	16	20
Xylenes, Total	0.94	U	106	107		ug/Kg	☼	101	80 - 120	12	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: MB 160-404776/8
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/09/18 15:53	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/09/18 15:53	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/09/18 15:53	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/09/18 15:53	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/09/18 15:53	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/09/18 15:53	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/09/18 15:53	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/09/18 15:53	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/09/18 15:53	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/09/18 15:53	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/09/18 15:53	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/09/18 15:53	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-404776/8
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.5	U	20	6.5	ug/Kg			12/09/18 15:53	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/09/18 15:53	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/09/18 15:53	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/09/18 15:53	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/09/18 15:53	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/09/18 15:53	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/09/18 15:53	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/09/18 15:53	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/09/18 15:53	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/09/18 15:53	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/09/18 15:53	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/09/18 15:53	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/09/18 15:53	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/09/18 15:53	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/09/18 15:53	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/09/18 15:53	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/09/18 15:53	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/09/18 15:53	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/09/18 15:53	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/09/18 15:53	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/09/18 15:53	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/09/18 15:53	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl alcohol	*17.4*	*J*	*ug/Kg*		*4.47*	*67-63-0*		*12/09/18 15:53*	*1*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/09/18 15:53*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*		*12/09/18 15:53*	*1*
4-Bromofluorobenzene (Surr)	*111*		*59 - 150*		*12/09/18 15:53*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/09/18 15:53*	*1*
Toluene-d8 (Surr)	*98*		*74 - 135*		*12/09/18 15:53*	*1*

Lab Sample ID: LCS 160-404776/5
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	52.1		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	48.5		ug/Kg		97	52 - 140
1,1,2-Trichloroethane	50.0	50.6		ug/Kg		101	79 - 122
1,1-Dichloroethane	50.0	48.6		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	50.7		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	45.7		ug/Kg		91	68 - 128
1,2-Dichloroethene, Total	100	103		ug/Kg		103	79 - 121
1,2-Dichloropropane	50.0	60.1		ug/Kg		120	80 - 126
2-Butanone (MEK)	50.0	51.9		ug/Kg		104	41 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-404776/5
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Hexanone	50.0	45.5		ug/Kg		91	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	40.6		ug/Kg		81	39 - 140
Benzene	50.0	58.0		ug/Kg		116	80 - 120
Bromodichloromethane	50.0	50.8		ug/Kg		102	78 - 124
Bromoform	50.0	51.7		ug/Kg		103	67 - 135
Bromomethane	50.0	58.5		ug/Kg		117	61 - 132
Carbon disulfide	50.0	51.9		ug/Kg		104	74 - 124
Carbon tetrachloride	50.0	53.6		ug/Kg		107	68 - 130
Chlorobenzene	50.0	49.4		ug/Kg		99	80 - 120
Chloroethane	50.0	55.3		ug/Kg		111	73 - 129
Chloroform	50.0	52.2		ug/Kg		104	78 - 120
Chloromethane	50.0	59.1		ug/Kg		118	69 - 123
cis-1,3-Dichloropropene	50.0	59.6		ug/Kg		119	78 - 127
Dibromochloromethane	50.0	49.2		ug/Kg		98	77 - 126
Ethylbenzene	50.0	48.3		ug/Kg		97	79 - 126
Methylene Chloride	50.0	49.0		ug/Kg		98	76 - 120
Styrene	50.0	49.9		ug/Kg		100	80 - 129
Tetrachloroethene	50.0	52.6		ug/Kg		105	76 - 126
Toluene	50.0	60.3		ug/Kg		121	76 - 136
trans-1,3-Dichloropropene	50.0	51.7		ug/Kg		103	77 - 136
Trichloroethene	50.0	52.4		ug/Kg		105	66 - 130
Vinyl chloride	50.0	58.5		ug/Kg		117	56 - 134
Xylenes, Total	100	99.1		ug/Kg		99	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*111*		*74 - 135*

Lab Sample ID: LCSD 160-404776/6
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	51.2		ug/Kg		102	52 - 140	5	20
1,1,2-Trichloroethane	50.0	43.0		ug/Kg		86	79 - 122	16	20
1,1-Dichloroethane	50.0	52.3		ug/Kg		105	80 - 120	7	20
1,1-Dichloroethene	50.0	55.1		ug/Kg		110	71 - 126	8	20
1,2-Dichloroethane	50.0	48.1		ug/Kg		96	68 - 128	5	20
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121	9	20
1,2-Dichloropropane	50.0	54.9		ug/Kg		110	80 - 126	9	20
2-Butanone (MEK)	50.0	49.2		ug/Kg		98	41 - 140	5	20
2-Hexanone	50.0	40.5		ug/Kg		81	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)	50.0	41.6		ug/Kg		83	67 - 130	4	20
Acetone	50.0	45.7		ug/Kg		91	39 - 140	12	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-404776/6
Matrix: Solid
Analysis Batch: 404776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	50.0	54.5		ug/Kg		109	80 - 120	6	20
Bromodichloromethane	50.0	49.8		ug/Kg		100	78 - 124	2	20
Bromoform	50.0	47.2		ug/Kg		94	67 - 135	9	20
Bromomethane	50.0	63.3		ug/Kg		127	61 - 132	8	20
Carbon disulfide	50.0	56.6		ug/Kg		113	74 - 124	9	20
Carbon tetrachloride	50.0	52.0		ug/Kg		104	68 - 130	3	20
Chlorobenzene	50.0	48.3		ug/Kg		97	80 - 120	2	20
Chloroethane	50.0	59.6		ug/Kg		119	73 - 129	8	20
Chloroform	50.0	49.9		ug/Kg		100	78 - 120	5	20
Chloromethane	50.0	62.9	o	ug/Kg		126	69 - 123	6	20
cis-1,3-Dichloropropene	50.0	55.2		ug/Kg		110	78 - 127	8	20
Dibromochloromethane	50.0	42.5		ug/Kg		85	77 - 126	15	20
Ethylbenzene	50.0	47.8		ug/Kg		96	79 - 126	1	20
Methylene Chloride	50.0	54.4		ug/Kg		109	76 - 120	11	20
Styrene	50.0	50.6		ug/Kg		101	80 - 129	1	20
Tetrachloroethene	50.0	45.2		ug/Kg		90	76 - 126	15	20
Toluene	50.0	52.2		ug/Kg		104	76 - 136	14	20
trans-1,3-Dichloropropene	50.0	45.7		ug/Kg		91	77 - 136	12	20
Trichloroethene	50.0	52.1		ug/Kg		104	66 - 130	1	20
Vinyl chloride	50.0	63.9		ug/Kg		128	56 - 134	9	20
Xylenes, Total	100	104		ug/Kg		104	79 - 132	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*92*		*74 - 135*

Lab Sample ID: 160-32017-2 MS
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFN0
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.42	U	53.7	58.9		ug/Kg	☼	110	80 - 120
1,1,2,2-Tetrachloroethane	1.9	U	53.7	51.2		ug/Kg	☼	95	78 - 120
1,1,2-Trichloroethane	1.2	U	53.7	55.5		ug/Kg	☼	103	80 - 120
1,1-Dichloroethane	0.38	U	53.7	59.3		ug/Kg	☼	110	80 - 120
1,1-Dichloroethene	1.6	U	53.7	61.4		ug/Kg	☼	114	78 - 121
1,2-Dichloroethane	0.85	U	53.7	55.5		ug/Kg	☼	103	78 - 117
1,2-Dichloroethene, Total	1.3	U	107	123		ug/Kg	☼	115	80 - 120
1,2-Dichloropropane	0.59	U T	53.7	74.0	T	ug/Kg	☼	138	80 - 120
2-Butanone (MEK)	1.9	U	53.7	56.5		ug/Kg	☼	105	69 - 124
2-Hexanone	3.3	U	53.7	48.9		ug/Kg	☼	91	62 - 118
4-Methyl-2-pentanone (MIBK)	2.5	U	53.7	52.0		ug/Kg	☼	97	73 - 125
Acetone	6.3	U	53.7	55.3		ug/Kg	☼	103	54 - 139
Benzene	0.25	U	53.7	60.2		ug/Kg	☼	112	80 - 120
Bromodichloromethane	0.48	U	53.7	64.2		ug/Kg	☼	120	80 - 120
Bromoform	1.9	U	53.7	58.5		ug/Kg	☼	109	80 - 125

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32017-2 MS
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFN0
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromomethane	2.3	U T	53.7	71.4	T	ug/Kg	☼	133	70 - 126
Carbon disulfide	0.67	U	53.7	62.7		ug/Kg	☼	117	79 - 121
Carbon tetrachloride	0.50	U	53.7	58.4		ug/Kg	☼	109	80 - 120
Chlorobenzene	0.79	U	53.7	56.7		ug/Kg	☼	105	80 - 120
Chloroethane	1.9	U	53.7	67.3		ug/Kg	☼	125	64 - 133
Chloroform	0.37	U	53.7	56.3		ug/Kg	☼	105	80 - 120
Chloromethane	0.63	U o T	53.7	69.2	T	ug/Kg	☼	129	75 - 120
cis-1,3-Dichloropropene	2.1	U T	53.7	66.4	T	ug/Kg	☼	124	80 - 120
Dibromochloromethane	1.2	U	53.7	58.3		ug/Kg	☼	108	80 - 120
Ethylbenzene	0.67	U	53.7	54.8		ug/Kg	☼	102	80 - 120
Methylene Chloride	1.5	U	53.7	59.7		ug/Kg	☼	111	77 - 123
Styrene	1.9	U	53.7	52.4		ug/Kg	☼	98	80 - 120
Tetrachloroethene	0.55	U	53.7	55.3		ug/Kg	☼	103	80 - 120
Toluene	2.5	U	53.7	60.2		ug/Kg	☼	112	80 - 124
trans-1,3-Dichloropropene	1.7	U	53.7	59.2		ug/Kg	☼	110	80 - 122
Trichloroethene	0.38	U T	53.7	66.6	T	ug/Kg	☼	124	79 - 120
Vinyl chloride	0.42	U T	53.7	70.7	T	ug/Kg	☼	132	71 - 120
Xylenes, Total	0.83	U	107	106		ug/Kg	☼	98	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*67 - 132*
4-Bromofluorobenzene (Surr)	*108*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32017-2 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFN0
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.42	U	53.7	58.4		ug/Kg	☼	109	80 - 120	1	20
1,1,2,2-Tetrachloroethane	1.9	U	53.7	55.5		ug/Kg	☼	103	78 - 120	8	20
1,1,2-Trichloroethane	1.2	U	53.7	52.4		ug/Kg	☼	98	80 - 120	6	20
1,1-Dichloroethane	0.38	U	53.7	59.4		ug/Kg	☼	111	80 - 120	0	20
1,1-Dichloroethene	1.6	U	53.7	61.7		ug/Kg	☼	115	78 - 121	0	20
1,2-Dichloroethane	0.85	U	53.7	52.5		ug/Kg	☼	98	78 - 117	6	20
1,2-Dichloroethene, Total	1.3	U	107	124		ug/Kg	☼	116	80 - 120	1	20
1,2-Dichloropropane	0.59	U T	53.7	59.6	y	ug/Kg	☼	111	80 - 120	22	20
2-Butanone (MEK)	1.9	U	53.7	51.8		ug/Kg	☼	97	69 - 124	9	20
2-Hexanone	3.3	U	53.7	45.8		ug/Kg	☼	85	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	2.5	U	53.7	49.6		ug/Kg	☼	92	73 - 125	5	20
Acetone	6.3	U	53.7	55.0		ug/Kg	☼	102	54 - 139	1	20
Benzene	0.25	U	53.7	60.5		ug/Kg	☼	113	80 - 120	0	20
Bromodichloromethane	0.48	U	53.7	54.8		ug/Kg	☼	102	80 - 120	16	20
Bromoform	1.9	U	53.7	56.5		ug/Kg	☼	105	80 - 125	3	20
Bromomethane	2.3	U T	53.7	72.4	T	ug/Kg	☼	135	70 - 126	1	20
Carbon disulfide	0.67	U	53.7	62.7		ug/Kg	☼	117	79 - 121	0	20
Carbon tetrachloride	0.50	U	53.7	57.5		ug/Kg	☼	107	80 - 120	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32017-2 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFN0
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorobenzene	0.79	U	53.7	55.7		ug/Kg	☼	104	80 - 120	2	20
Chloroethane	1.9	U	53.7	68.4		ug/Kg	☼	127	64 - 133	2	20
Chloroform	0.37	U	53.7	55.5		ug/Kg	☼	103	80 - 120	1	20
Chloromethane	0.63	U o T	53.7	69.4	T	ug/Kg	☼	129	75 - 120	0	20
cis-1,3-Dichloropropene	2.1	U T	53.7	60.4		ug/Kg	☼	112	80 - 120	10	20
Dibromochloromethane	1.2	U	53.7	53.1		ug/Kg	☼	99	80 - 120	9	20
Ethylbenzene	0.67	U	53.7	59.4		ug/Kg	☼	111	80 - 120	8	20
Methylene Chloride	1.5	U	53.7	59.8		ug/Kg	☼	111	77 - 123	0	20
Styrene	1.9	U	53.7	63.4		ug/Kg	☼	118	80 - 120	19	20
Tetrachloroethene	0.55	U	53.7	55.8		ug/Kg	☼	104	80 - 120	1	20
Toluene	2.5	U	53.7	62.0		ug/Kg	☼	115	80 - 124	3	20
trans-1,3-Dichloropropene	1.7	U	53.7	55.0		ug/Kg	☼	102	80 - 122	7	20
Trichloroethene	0.38	U T	53.7	62.1		ug/Kg	☼	116	79 - 120	7	20
Vinyl chloride	0.42	U T	53.7	71.5	T	ug/Kg	☼	133	71 - 120	1	20
Xylenes, Total	0.83	U	107	125		ug/Kg	☼	116	80 - 120	17	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*115*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32017-1	B3KFL8	122	114	97	104
160-32017-1 MS	B3KFL8	103	109	104	107
160-32017-1 MSD	B3KFL8	97	105	101	104
160-32017-2	B3KFN0	94	101	103	86
160-32017-2 MS	B3KFN0	100	108	100	104
160-32017-2 MSD	B3KFN0	93	115	98	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-404683/4	Lab Control Sample	106	105	106	102
LCS 160-404776/5	Lab Control Sample	90	105	105	111
LCSD 160-404683/5	Lab Control Sample Dup	98	105	103	105
LCSD 160-404776/6	Lab Control Sample Dup	93	104	99	92
MB 160-404683/7	Method Blank	103	105	104	105
MB 160-404776/8	Method Blank	95	111	102	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32017-1	B3KFL8	75	82	82	67	80	85
160-32017-1 MS	B3KFL8	79	81	81	79	81	85
160-32017-1 MSD	B3KFL8	86	83	84	80	87	91
160-32017-2 - DL	B3KFN0	68	87	93	75	89	100 X

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-405438/8
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/12/18 19:15	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/12/18 19:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/12/18 19:15	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/12/18 19:15	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/12/18 19:15	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/12/18 19:15	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/12/18 19:15	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/12/18 19:15	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/12/18 19:15	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/12/18 19:15	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/12/18 19:15	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/12/18 19:15	1
Acetone	6.5	U	20	6.5	ug/Kg			12/12/18 19:15	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/12/18 19:15	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/12/18 19:15	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/12/18 19:15	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/12/18 19:15	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/12/18 19:15	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/12/18 19:15	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/12/18 19:15	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/12/18 19:15	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/12/18 19:15	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/12/18 19:15	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/12/18 19:15	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/12/18 19:15	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/12/18 19:15	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/12/18 19:15	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/12/18 19:15	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/12/18 19:15	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/12/18 19:15	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/12/18 19:15	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/12/18 19:15	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/12/18 19:15	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/12/18 19:15	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/12/18 19:15*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*		*12/12/18 19:15*	*1*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*		*12/12/18 19:15*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/12/18 19:15*	*1*
Toluene-d8 (Surr)	*104*		*74 - 135*		*12/12/18 19:15*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405438/5
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	52.8		ug/Kg		106	71 - 127
1,1,2,2-Tetrachloroethane	50.0	50.8		ug/Kg		102	52 - 140
1,1,2-Trichloroethane	50.0	52.2		ug/Kg		104	79 - 122
1,1-Dichloroethane	50.0	53.3		ug/Kg		107	80 - 120
1,1-Dichloroethene	50.0	54.4		ug/Kg		109	71 - 126
1,2-Dichloroethane	50.0	51.2		ug/Kg		102	68 - 128
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121
1,2-Dichloropropane	50.0	56.1		ug/Kg		112	80 - 126
2-Butanone (MEK)	50.0	54.1		ug/Kg		108	41 - 140
2-Hexanone	50.0	51.0		ug/Kg		102	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	51.0		ug/Kg		102	67 - 130
Acetone	50.0	48.5		ug/Kg		97	39 - 140
Benzene	50.0	52.7		ug/Kg		105	80 - 120
Bromodichloromethane	50.0	54.5		ug/Kg		109	78 - 124
Bromoform	50.0	51.3		ug/Kg		103	67 - 135
Bromomethane	50.0	52.5		ug/Kg		105	61 - 132
Carbon disulfide	50.0	53.3		ug/Kg		107	74 - 124
Carbon tetrachloride	50.0	52.7		ug/Kg		105	68 - 130
Chlorobenzene	50.0	52.2		ug/Kg		104	80 - 120
Chloroethane	50.0	47.7		ug/Kg		95	73 - 129
Chloroform	50.0	51.5		ug/Kg		103	78 - 120
Chloromethane	50.0	64.5	o	ug/Kg		129	69 - 123
cis-1,3-Dichloropropene	50.0	57.9		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	54.4		ug/Kg		109	77 - 126
Ethylbenzene	50.0	52.9		ug/Kg		106	79 - 126
Methylene Chloride	50.0	54.8		ug/Kg		110	76 - 120
Styrene	50.0	57.9		ug/Kg		116	80 - 129
Tetrachloroethene	50.0	53.2		ug/Kg		106	76 - 126
Toluene	50.0	57.6		ug/Kg		115	76 - 136
trans-1,3-Dichloropropene	50.0	56.3		ug/Kg		113	77 - 136
Trichloroethene	50.0	52.0		ug/Kg		104	66 - 130
Vinyl chloride	50.0	57.2		ug/Kg		114	56 - 134
Xylenes, Total	100	116		ug/Kg		116	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Lab Sample ID: LCSD 160-405438/6
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	53.0		ug/Kg		106	71 - 127	0	20
1,1,2,2-Tetrachloroethane	50.0	50.3		ug/Kg		101	52 - 140	1	20
1,1,2-Trichloroethane	50.0	51.5		ug/Kg		103	79 - 122	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405438/6
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	52.9		ug/Kg		106	80 - 120	1	20
1,1-Dichloroethene	50.0	54.9		ug/Kg		110	71 - 126	1	20
1,2-Dichloroethane	50.0	50.6		ug/Kg		101	68 - 128	1	20
1,2-Dichloroethene, Total	100	112		ug/Kg		112	79 - 121	0	20
1,2-Dichloropropane	50.0	55.6		ug/Kg		111	80 - 126	1	20
2-Butanone (MEK)	50.0	54.5		ug/Kg		109	41 - 140	1	20
2-Hexanone	50.0	50.7		ug/Kg		101	63 - 136	1	20
4-Methyl-2-pentanone (MIBK)	50.0	50.1		ug/Kg		100	67 - 130	2	20
Acetone	50.0	47.3		ug/Kg		95	39 - 140	2	20
Benzene	50.0	52.2		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	54.1		ug/Kg		108	78 - 124	1	20
Bromoform	50.0	51.5		ug/Kg		103	67 - 135	0	20
Bromomethane	50.0	54.7		ug/Kg		109	61 - 132	4	20
Carbon disulfide	50.0	53.6		ug/Kg		107	74 - 124	1	20
Carbon tetrachloride	50.0	51.4		ug/Kg		103	68 - 130	2	20
Chlorobenzene	50.0	51.3		ug/Kg		103	80 - 120	2	20
Chloroethane	50.0	48.6		ug/Kg		97	73 - 129	2	20
Chloroform	50.0	50.1		ug/Kg		100	78 - 120	3	20
Chloromethane	50.0	58.7		ug/Kg		117	69 - 123	9	20
cis-1,3-Dichloropropene	50.0	58.9		ug/Kg		118	78 - 127	2	20
Dibromochloromethane	50.0	53.5		ug/Kg		107	77 - 126	2	20
Ethylbenzene	50.0	52.3		ug/Kg		105	79 - 126	1	20
Methylene Chloride	50.0	54.1		ug/Kg		108	76 - 120	1	20
Styrene	50.0	56.4		ug/Kg		113	80 - 129	3	20
Tetrachloroethene	50.0	52.6		ug/Kg		105	76 - 126	1	20
Toluene	50.0	56.5		ug/Kg		113	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	55.6		ug/Kg		111	77 - 136	1	20
Trichloroethene	50.0	52.5		ug/Kg		105	66 - 130	1	20
Vinyl chloride	50.0	56.0		ug/Kg		112	56 - 134	2	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32070-1 MS
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.48	U	52.5	55.1		ug/Kg	☼	105	80 - 120
1,1,2,2-Tetrachloroethane	2.2	U	52.5	46.9		ug/Kg	☼	89	78 - 120
1,1,2-Trichloroethane	1.3	U	52.5	54.0		ug/Kg	☼	103	80 - 120
1,1-Dichloroethane	0.43	U	52.5	55.6		ug/Kg	☼	106	80 - 120
1,1-Dichloroethene	1.8	U	52.5	55.6		ug/Kg	☼	106	78 - 121
1,2-Dichloroethane	0.97	U	52.5	53.7		ug/Kg	☼	102	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32070-1 MS
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.5	U	105	115		ug/Kg	☼	110	80 - 120
1,2-Dichloropropane	0.67	U	52.5	57.1		ug/Kg	☼	109	80 - 120
2-Butanone (MEK)	2.1	U	52.5	54.1		ug/Kg	☼	103	69 - 124
2-Hexanone	3.7	U	52.5	44.7		ug/Kg	☼	85	62 - 118
4-Methyl-2-pentanone (MIBK)	2.8	U	52.5	49.9		ug/Kg	☼	95	73 - 125
Acetone	7.2	U	52.5	60.0		ug/Kg	☼	114	54 - 139
Benzene	0.29	U	52.5	54.2		ug/Kg	☼	103	80 - 120
Bromodichloromethane	0.55	U	52.5	54.8		ug/Kg	☼	104	80 - 120
Bromoform	2.2	U	52.5	54.1		ug/Kg	☼	103	80 - 125
Bromomethane	2.6	U	52.5	56.2		ug/Kg	☼	107	70 - 126
Carbon disulfide	0.77	U	52.5	54.4		ug/Kg	☼	104	79 - 121
Carbon tetrachloride	0.57	U	52.5	53.9		ug/Kg	☼	103	80 - 120
Chlorobenzene	0.90	U	52.5	53.4		ug/Kg	☼	102	80 - 120
Chloroethane	2.2	U	52.5	49.5		ug/Kg	☼	94	64 - 133
Chloroform	0.42	U	52.5	53.1		ug/Kg	☼	101	80 - 120
Chloromethane	0.72	U o	52.5	59.0		ug/Kg	☼	112	75 - 120
cis-1,3-Dichloropropene	2.3	U	52.5	59.1		ug/Kg	☼	112	80 - 120
Dibromochloromethane	1.4	U	52.5	56.1		ug/Kg	☼	107	80 - 120
Ethylbenzene	0.77	U	52.5	54.9		ug/Kg	☼	105	80 - 120
Methylene Chloride	1.8	U	52.5	55.7		ug/Kg	☼	106	77 - 123
Styrene	2.2	U	52.5	58.2		ug/Kg	☼	111	80 - 120
Tetrachloroethene	0.62	U	52.5	52.9		ug/Kg	☼	101	80 - 120
Toluene	2.8	U	52.5	59.0		ug/Kg	☼	112	80 - 124
trans-1,3-Dichloropropene	1.9	U	52.5	59.0		ug/Kg	☼	112	80 - 122
Trichloroethene	0.43	U	52.5	58.7		ug/Kg	☼	112	79 - 120
Vinyl chloride	0.48	U	52.5	55.3		ug/Kg	☼	105	71 - 120
Xylenes, Total	0.94	U	105	116		ug/Kg	☼	111	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.48	U	49.7	51.1		ug/Kg	☼	103	80 - 120	8	20
1,1,2,2-Tetrachloroethane	2.2	U	49.7	43.0		ug/Kg	☼	87	78 - 120	9	20
1,1,2-Trichloroethane	1.3	U	49.7	50.8		ug/Kg	☼	102	80 - 120	6	20
1,1-Dichloroethane	0.43	U	49.7	51.0		ug/Kg	☼	102	80 - 120	9	20
1,1-Dichloroethene	1.8	U	49.7	51.8		ug/Kg	☼	104	78 - 121	7	20
1,2-Dichloroethane	0.97	U	49.7	47.8		ug/Kg	☼	96	78 - 117	12	20
1,2-Dichloroethene, Total	1.5	U	99.5	107		ug/Kg	☼	108	80 - 120	7	20
1,2-Dichloropropane	0.67	U	49.7	53.6		ug/Kg	☼	108	80 - 120	6	20
2-Butanone (MEK)	2.1	U	49.7	46.2		ug/Kg	☼	93	69 - 124	16	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.7	U	49.7	42.1		ug/Kg	☼	85	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	2.8	U	49.7	47.0		ug/Kg	☼	95	73 - 125	6	20
Acetone	7.2	U	49.7	54.0		ug/Kg	☼	109	54 - 139	11	20
Benzene	0.29	U	49.7	50.5		ug/Kg	☼	102	80 - 120	7	20
Bromodichloromethane	0.55	U	49.7	51.1		ug/Kg	☼	103	80 - 120	7	20
Bromoform	2.2	U	49.7	50.0		ug/Kg	☼	101	80 - 125	8	20
Bromomethane	2.6	U	49.7	50.0		ug/Kg	☼	101	70 - 126	12	20
Carbon disulfide	0.77	U	49.7	51.2		ug/Kg	☼	103	79 - 121	6	20
Carbon tetrachloride	0.57	U	49.7	49.7		ug/Kg	☼	100	80 - 120	8	20
Chlorobenzene	0.90	U	49.7	50.1		ug/Kg	☼	101	80 - 120	6	20
Chloroethane	2.2	U	49.7	46.2		ug/Kg	☼	93	64 - 133	7	20
Chloroform	0.42	U	49.7	49.2		ug/Kg	☼	99	80 - 120	8	20
Chloromethane	0.72	U o	49.7	54.6		ug/Kg	☼	110	75 - 120	8	20
cis-1,3-Dichloropropene	2.3	U	49.7	56.7		ug/Kg	☼	114	80 - 120	4	20
Dibromochloromethane	1.4	U	49.7	51.4		ug/Kg	☼	103	80 - 120	9	20
Ethylbenzene	0.77	U	49.7	50.8		ug/Kg	☼	102	80 - 120	8	20
Methylene Chloride	1.8	U	49.7	52.1		ug/Kg	☼	105	77 - 123	7	20
Styrene	2.2	U	49.7	55.0		ug/Kg	☼	111	80 - 120	6	20
Tetrachloroethene	0.62	U	49.7	49.2		ug/Kg	☼	99	80 - 120	7	20
Toluene	2.8	U	49.7	55.1		ug/Kg	☼	111	80 - 124	7	20
trans-1,3-Dichloropropene	1.9	U	49.7	53.9		ug/Kg	☼	108	80 - 122	9	20
Trichloroethene	0.43	U	49.7	54.8		ug/Kg	☼	110	79 - 120	7	20
Vinyl chloride	0.48	U	49.7	52.6		ug/Kg	☼	106	71 - 120	5	20
Xylenes, Total	0.94	U	99.5	110		ug/Kg	☼	110	80 - 120	6	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404156/1-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404156

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/05/18 09:35	12/07/18 13:16	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32070-1
SDG: SL32070-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32070-1	B3KFF6	104	107	101	105
160-32070-1 MS	B3KFF6	100	105	99	104
160-32070-1 MSD	B3KFF6	95	101	98	103
160-32070-2	B3KFK6	101	102	102	104
160-32070-3	B3KFK3	105	106	100	104
160-32070-4	B3KFP5	105	105	101	104
160-32070-5	B3KFM4	105	105	100	102
160-32070-6	B3KFL5	105	105	105	103
160-32070-7	B3KFP8	107	102	108	102
160-32070-8	B3KFM7	108	110	104	103
160-32070-9	B3L196	114	104	106	103
160-32070-10	B3KFJ7	115	109	106	106
160-32070-11	B3KFP2	113	107	104	103
160-32070-12	B3KFK0	111	107	105	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405438/5	Lab Control Sample	98	101	100	103
LCSD 160-405438/6	Lab Control Sample Dup	96	101	101	104
MB 160-405438/8	Method Blank	99	101	102	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32070-1	B3KFF6	72	74	73	57	66	76
160-32070-1 MS	B3KFF6	78	76	75	67	70	82
160-32070-1 MSD	B3KFF6	68	71	72	66	68	77
160-32070-2	B3KFK6	80	81	80	64	75	85
160-32070-3	B3KFK3	75	80	84	66	80	83
160-32070-4	B3KFP5	75	78	81	63	78	81
160-32070-5	B3KFM4	82	84	83	68	77	87

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-405438/8
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/12/18 19:15	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/12/18 19:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/12/18 19:15	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/12/18 19:15	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/12/18 19:15	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/12/18 19:15	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/12/18 19:15	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/12/18 19:15	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/12/18 19:15	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/12/18 19:15	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/12/18 19:15	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/12/18 19:15	1
Acetone	6.5	U	20	6.5	ug/Kg			12/12/18 19:15	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/12/18 19:15	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/12/18 19:15	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/12/18 19:15	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/12/18 19:15	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/12/18 19:15	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/12/18 19:15	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/12/18 19:15	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/12/18 19:15	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/12/18 19:15	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/12/18 19:15	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/12/18 19:15	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/12/18 19:15	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/12/18 19:15	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/12/18 19:15	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/12/18 19:15	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/12/18 19:15	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/12/18 19:15	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/12/18 19:15	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/12/18 19:15	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/12/18 19:15	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/12/18 19:15	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/12/18 19:15*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*		*12/12/18 19:15*	*1*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*		*12/12/18 19:15*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/12/18 19:15*	*1*
Toluene-d8 (Surr)	*104*		*74 - 135*		*12/12/18 19:15*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405438/5
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	52.8		ug/Kg		106	71 - 127
1,1,2,2-Tetrachloroethane	50.0	50.8		ug/Kg		102	52 - 140
1,1,2-Trichloroethane	50.0	52.2		ug/Kg		104	79 - 122
1,1-Dichloroethane	50.0	53.3		ug/Kg		107	80 - 120
1,1-Dichloroethene	50.0	54.4		ug/Kg		109	71 - 126
1,2-Dichloroethane	50.0	51.2		ug/Kg		102	68 - 128
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121
1,2-Dichloropropane	50.0	56.1		ug/Kg		112	80 - 126
2-Butanone (MEK)	50.0	54.1		ug/Kg		108	41 - 140
2-Hexanone	50.0	51.0		ug/Kg		102	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	51.0		ug/Kg		102	67 - 130
Acetone	50.0	48.5		ug/Kg		97	39 - 140
Benzene	50.0	52.7		ug/Kg		105	80 - 120
Bromodichloromethane	50.0	54.5		ug/Kg		109	78 - 124
Bromoform	50.0	51.3		ug/Kg		103	67 - 135
Bromomethane	50.0	52.5		ug/Kg		105	61 - 132
Carbon disulfide	50.0	53.3		ug/Kg		107	74 - 124
Carbon tetrachloride	50.0	52.7		ug/Kg		105	68 - 130
Chlorobenzene	50.0	52.2		ug/Kg		104	80 - 120
Chloroethane	50.0	47.7		ug/Kg		95	73 - 129
Chloroform	50.0	51.5		ug/Kg		103	78 - 120
Chloromethane	50.0	64.5	o	ug/Kg		129	69 - 123
cis-1,3-Dichloropropene	50.0	57.9		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	54.4		ug/Kg		109	77 - 126
Ethylbenzene	50.0	52.9		ug/Kg		106	79 - 126
Methylene Chloride	50.0	54.8		ug/Kg		110	76 - 120
Styrene	50.0	57.9		ug/Kg		116	80 - 129
Tetrachloroethene	50.0	53.2		ug/Kg		106	76 - 126
Toluene	50.0	57.6		ug/Kg		115	76 - 136
trans-1,3-Dichloropropene	50.0	56.3		ug/Kg		113	77 - 136
Trichloroethene	50.0	52.0		ug/Kg		104	66 - 130
Vinyl chloride	50.0	57.2		ug/Kg		114	56 - 134
Xylenes, Total	100	116		ug/Kg		116	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Lab Sample ID: LCSD 160-405438/6
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	53.0		ug/Kg		106	71 - 127	0	20
1,1,2,2-Tetrachloroethane	50.0	50.3		ug/Kg		101	52 - 140	1	20
1,1,2-Trichloroethane	50.0	51.5		ug/Kg		103	79 - 122	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405438/6
Matrix: Solid
Analysis Batch: 405438

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	52.9		ug/Kg		106	80 - 120	1	20
1,1-Dichloroethene	50.0	54.9		ug/Kg		110	71 - 126	1	20
1,2-Dichloroethane	50.0	50.6		ug/Kg		101	68 - 128	1	20
1,2-Dichloroethene, Total	100	112		ug/Kg		112	79 - 121	0	20
1,2-Dichloropropane	50.0	55.6		ug/Kg		111	80 - 126	1	20
2-Butanone (MEK)	50.0	54.5		ug/Kg		109	41 - 140	1	20
2-Hexanone	50.0	50.7		ug/Kg		101	63 - 136	1	20
4-Methyl-2-pentanone (MIBK)	50.0	50.1		ug/Kg		100	67 - 130	2	20
Acetone	50.0	47.3		ug/Kg		95	39 - 140	2	20
Benzene	50.0	52.2		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	54.1		ug/Kg		108	78 - 124	1	20
Bromoform	50.0	51.5		ug/Kg		103	67 - 135	0	20
Bromomethane	50.0	54.7		ug/Kg		109	61 - 132	4	20
Carbon disulfide	50.0	53.6		ug/Kg		107	74 - 124	1	20
Carbon tetrachloride	50.0	51.4		ug/Kg		103	68 - 130	2	20
Chlorobenzene	50.0	51.3		ug/Kg		103	80 - 120	2	20
Chloroethane	50.0	48.6		ug/Kg		97	73 - 129	2	20
Chloroform	50.0	50.1		ug/Kg		100	78 - 120	3	20
Chloromethane	50.0	58.7		ug/Kg		117	69 - 123	9	20
cis-1,3-Dichloropropene	50.0	58.9		ug/Kg		118	78 - 127	2	20
Dibromochloromethane	50.0	53.5		ug/Kg		107	77 - 126	2	20
Ethylbenzene	50.0	52.3		ug/Kg		105	79 - 126	1	20
Methylene Chloride	50.0	54.1		ug/Kg		108	76 - 120	1	20
Styrene	50.0	56.4		ug/Kg		113	80 - 129	3	20
Tetrachloroethene	50.0	52.6		ug/Kg		105	76 - 126	1	20
Toluene	50.0	56.5		ug/Kg		113	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	55.6		ug/Kg		111	77 - 136	1	20
Trichloroethene	50.0	52.5		ug/Kg		105	66 - 130	1	20
Vinyl chloride	50.0	56.0		ug/Kg		112	56 - 134	2	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32072-8 MS
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.49	U	53.6	56.0		ug/Kg	☼	104	80 - 120
1,1,2,2-Tetrachloroethane	2.2	U	53.6	45.3		ug/Kg	☼	85	78 - 120
1,1,2-Trichloroethane	1.3	U	53.6	53.3		ug/Kg	☼	99	80 - 120
1,1-Dichloroethane	0.44	U	53.6	56.6		ug/Kg	☼	106	80 - 120
1,1-Dichloroethene	1.8	U	53.6	57.8		ug/Kg	☼	108	78 - 121
1,2-Dichloroethane	0.99	U	53.6	52.8		ug/Kg	☼	99	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32072-8 MS
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.5	U	107	119		ug/Kg	☼	111	80 - 120
1,2-Dichloropropane	0.68	U	53.6	57.8		ug/Kg	☼	108	80 - 120
2-Butanone (MEK)	2.2	U	53.6	53.6		ug/Kg	☼	100	69 - 124
2-Hexanone	3.8	U	53.6	48.1		ug/Kg	☼	90	62 - 118
4-Methyl-2-pentanone (MIBK)	2.9	U	53.6	51.2		ug/Kg	☼	96	73 - 125
Acetone	7.3	U	53.6	58.1		ug/Kg	☼	108	54 - 139
Benzene	0.29	U	53.6	55.2		ug/Kg	☼	103	80 - 120
Bromodichloromethane	0.56	U	53.6	56.2		ug/Kg	☼	105	80 - 120
Bromoform	2.2	U	53.6	54.9		ug/Kg	☼	102	80 - 125
Bromomethane	2.7	U	53.6	59.0		ug/Kg	☼	110	70 - 126
Carbon disulfide	0.78	U	53.6	56.3		ug/Kg	☼	105	79 - 121
Carbon tetrachloride	0.58	U	53.6	55.8		ug/Kg	☼	104	80 - 120
Chlorobenzene	0.92	U	53.6	55.4		ug/Kg	☼	103	80 - 120
Chloroethane	2.2	U	53.6	51.9		ug/Kg	☼	97	64 - 133
Chloroform	0.43	U	53.6	53.0		ug/Kg	☼	99	80 - 120
Chloromethane	0.74	U o	53.6	61.1		ug/Kg	☼	114	75 - 120
cis-1,3-Dichloropropene	2.4	U	53.6	61.3		ug/Kg	☼	114	80 - 120
Dibromochloromethane	1.4	U	53.6	56.4		ug/Kg	☼	105	80 - 120
Ethylbenzene	0.78	U	53.6	55.6		ug/Kg	☼	104	80 - 120
Methylene Chloride	1.8	U	53.6	57.3		ug/Kg	☼	107	77 - 123
Styrene	2.2	U	53.6	59.4		ug/Kg	☼	111	80 - 120
Tetrachloroethene	0.64	U	53.6	55.1		ug/Kg	☼	103	80 - 120
Toluene	2.8	U	53.6	60.4		ug/Kg	☼	113	80 - 124
trans-1,3-Dichloropropene	2.0	U	53.6	57.7		ug/Kg	☼	108	80 - 122
Trichloroethene	0.44	U	53.6	61.0		ug/Kg	☼	114	79 - 120
Vinyl chloride	0.49	U	53.6	58.2		ug/Kg	☼	109	71 - 120
Xylenes, Total	0.96	U	107	118		ug/Kg	☼	110	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*105*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.49	U	52.7	54.7		ug/Kg	☼	104	80 - 120	2	20
1,1,2,2-Tetrachloroethane	2.2	U	52.7	45.5		ug/Kg	☼	86	78 - 120	0	20
1,1,2-Trichloroethane	1.3	U	52.7	53.1		ug/Kg	☼	101	80 - 120	0	20
1,1-Dichloroethane	0.44	U	52.7	55.2		ug/Kg	☼	105	80 - 120	2	20
1,1-Dichloroethene	1.8	U	52.7	55.3		ug/Kg	☼	105	78 - 121	4	20
1,2-Dichloroethane	0.99	U	52.7	51.0		ug/Kg	☼	97	78 - 117	3	20
1,2-Dichloroethene, Total	1.5	U	105	116		ug/Kg	☼	110	80 - 120	3	20
1,2-Dichloropropane	0.68	U	52.7	56.0		ug/Kg	☼	106	80 - 120	3	20
2-Butanone (MEK)	2.2	U	52.7	49.2		ug/Kg	☼	93	69 - 124	9	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.8	U	52.7	45.4		ug/Kg	☼	86	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	2.9	U	52.7	50.4		ug/Kg	☼	96	73 - 125	2	20
Acetone	7.3	U	52.7	56.0		ug/Kg	☼	106	54 - 139	4	20
Benzene	0.29	U	52.7	54.0		ug/Kg	☼	103	80 - 120	2	20
Bromodichloromethane	0.56	U	52.7	54.5		ug/Kg	☼	104	80 - 120	3	20
Bromoform	2.2	U	52.7	56.3		ug/Kg	☼	107	80 - 125	2	20
Bromomethane	2.7	U	52.7	57.7		ug/Kg	☼	110	70 - 126	2	20
Carbon disulfide	0.78	U	52.7	54.8		ug/Kg	☼	104	79 - 121	3	20
Carbon tetrachloride	0.58	U	52.7	53.0		ug/Kg	☼	101	80 - 120	5	20
Chlorobenzene	0.92	U	52.7	53.2		ug/Kg	☼	101	80 - 120	4	20
Chloroethane	2.2	U	52.7	54.4		ug/Kg	☼	103	64 - 133	5	20
Chloroform	0.43	U	52.7	52.1		ug/Kg	☼	99	80 - 120	2	20
Chloromethane	0.74	U o	52.7	61.2		ug/Kg	☼	116	75 - 120	0	20
cis-1,3-Dichloropropene	2.4	U	52.7	59.2		ug/Kg	☼	112	80 - 120	4	20
Dibromochloromethane	1.4	U	52.7	55.6		ug/Kg	☼	106	80 - 120	1	20
Ethylbenzene	0.78	U	52.7	53.5		ug/Kg	☼	102	80 - 120	4	20
Methylene Chloride	1.8	U	52.7	56.9		ug/Kg	☼	108	77 - 123	1	20
Styrene	2.2	U	52.7	57.8		ug/Kg	☼	110	80 - 120	3	20
Tetrachloroethene	0.64	U	52.7	53.1		ug/Kg	☼	101	80 - 120	4	20
Toluene	2.8	U	52.7	58.4		ug/Kg	☼	111	80 - 124	3	20
trans-1,3-Dichloropropene	2.0	U	52.7	56.6		ug/Kg	☼	107	80 - 122	2	20
Trichloroethene	0.44	U	52.7	59.4		ug/Kg	☼	113	79 - 120	3	20
Vinyl chloride	0.49	U	52.7	57.0		ug/Kg	☼	108	71 - 120	2	20
Xylenes, Total	0.96	U	105	116		ug/Kg	☼	110	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32072-1
SDG: SL32072-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32072-8	B3KFF3	102	101	101	102
160-32072-8 MS	B3KFF3	96	105	98	105
160-32072-8 MSD	B3KFF3	96	106	98	103
160-32072-9	B3KFM1	114	108	104	103
160-32072-10	B3KFN9	111	106	101	101
160-32072-11	B3L1B1	112	104	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405438/5	Lab Control Sample	98	101	100	103
LCSD 160-405438/6	Lab Control Sample Dup	96	101	101	104
MB 160-405438/8	Method Blank	99	101	102	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32072-8	B3KFF3	69	76	80	64	75	80
160-32072-8 MS	B3KFF3	81	80	82	75	78	87
160-32072-8 MSD	B3KFF3	85	81	73	65	73	90
160-32072-9	B3KFM1	77	80	83	67	80	86
160-32072-10 - DL	B3KFN9	0 X	0 X	0 X	0 X	0 X	0 X

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL32015-1, SL32017-1, SL32070-1, SL32072-1, GEL465551, GEL465631, GEL465731

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 prepared by TestAmerica Laboratories Inc. and SDGs GEL465551, GEL465631 and GEL465731 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KFH5	11/26/18	Soil	C	8270D
B3KFJ4	11/26/18	Soil	C	8270D
B3KFR1	11/26/18	Soil	C	8270D
B3KFR4	11/26/18	Soil	C	8270D
B3L193	11/26/18	Soil	C	8270D
B3KFH8	11/26/18	Soil	C	8270D
B3KFJ1	11/26/18	Soil	C	8270D
B3L1B0	11/26/18	Soil	C	8270D
B3KFH2	11/26/18	Soil	C	8270D
B3KFN6	11/26/18	Soil	C	8270D
B3KFF9	11/26/18	Soil	C	8270D
B3KFN3	11/26/18	Soil	C	8270D
B3KFL2	11/26/18	Soil	C	8270D
B3KFK9	11/26/18	Soil	C	8270D
B3KFL8	11/26/18	Soil	C	8270D
B3KFN0	11/26/18	Soil	C	8270D
B3KFF6	11/28/18	Soil	C	8270D
B3KFK6	11/28/18	Soil	C	8270D
B3KFK3	11/28/18	Soil	C	8270D
B3KFP5	11/28/18	Soil	C	8270D
B3KFM4	11/28/18	Soil	C	8270D
B3KFL5	11/28/18	Soil	C	8270D
B3KFP8	11/28/18	Soil	C	8270D
B3L196	11/28/18	Soil	C	8270D
B3KFJ7	11/28/18	Soil	C	8270D
B3KFP2	11/28/18	Soil	C	8270D
B3KFK0	11/28/18	Soil	C	8270D
B3KFM7	11/28/18	Soil	C	8270D
B3KFF3	11/28/18	Soil	C	8270D
B3KFM1	11/28/18	Soil	C	8270D

B3KFN9	11/28/18	Soil	C	8270D
B3MMX5	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMX6	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMX7	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMX8	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMY8	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN09	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN11	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMX9	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMY0	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMY5	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMY6	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN02	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN03	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN04	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MN10	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MMY3	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMY2	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN01	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN06	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN12	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMY1	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN07	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMY4	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMY9	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN05	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMX4	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMX3	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN00	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MMY7	11/28/18	Soil	C	WTPH-D, WTPH-G
B3MN08	11/28/18	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for WTPH-G requires analysis within 14 days from sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL32015-1, the 2,4,6-tribromophenol and nitrobenze-d5 surrogate recoveries for samples B3KFH5, B3KFN3 and B3KFL2 were below the lower acceptance limit but ≥20%. In addition, the 2,4,6-tribromophenol for samples B3KFK9 and the MB and nitrobenzene-d5 for sample B3KFJ1 were below the lower acceptance limit but ≥20%, All other associated surrogate

recoveries were within the acceptance limit, therefore based on professional judgment, data should not be qualified.

For SDG SL32017-1, the nitrobenzene-d5 surrogate recovery for sample B3KFL8 and the 2,4,6-tribromophenol surrogate recoveries for samples B3KFN0 and the MB were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries were within the acceptance limit, therefore based on professional judgment, data should not be qualified.

SDG SL32070-1
The 2,4,6-tribromophenol, 2-fluorobiphenyl, 2-fluorophenol, nitrobenzene-d5, phenol-d5 and terphenyl-d14 surrogate recoveries for sample B3KFJ7 were below the lower acceptance limit but ≥20%. All sample results were non-detects and should be qualified as estimates and flagged "UJ."

The nitrobenzene-d5 surrogate recoveries for samples B3KFF6, B3KFK6, B3KFK3, B3KFP5, B3KFM4, B3KFL5, B3KFP8, B3KFM7, B3L196, B3KFP2, B3KFK0 and the MB were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries were within the acceptance limit, therefore, based on professional judgment, data should not be qualified as a result.

The nitrobenzene surrogate recovery for sample B3KFF6MS and the 2,4,6-tribromophenol, nitrobenzene-d4 and phenol-d5 surrogate recoveries for sample B3KFF6MSD were below the acceptance limit but ≥20%. Since the samples were QC samples, data should not be qualified as a result.

SDG SL32072-1
The 2,4,6-tribromophenol, 2-flurobiphenyl, 2-fluorphenol, nitrobenzene-d5, phenol-d5 and terphenyl-d14 surrogate recoveries for sample B3KFN9 were <20%. The sample was analyzed at a 10X dilution, therefore, based on professional judgment data, should not be qualified as a result.

The 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for sample B3KFF3 were below the lower acceptance limit but ≥20%. In addition the nitrobenzene-d5 surrogate recovery for samples B3KFM1 and B3KFF3MSD and the 2,4,6-tribromophenol, nitrobenzene-d5 and phenol-d4 for the MB were below the lower acceptance limit but ≥20%. Since the other associated surrogate recoveries for sample B3KFF3 and B3KFM1 were within the acceptance limit and samples B3KFF3MSD and the MB were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32015-1, the MS and/or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2-nitroaniline, 3,3'-dichlorobenzidine, 3-nitroaniline, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-

methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone, naphthalene and pentachlorophenol were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32017-1, the MS and/or MSD recoveries for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorocyclopentadiene and hexachloroethane were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL32070-1, the MS and/or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methynaphthalene, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylether)ether, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol and phenol were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ.". See the table in Appendix 2 for a listing of affects samples.

SDG SL32072-1
The MS and /or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4,6-dinitro-2-methylphenol, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone and nitrobenzene were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MSD recoveries for benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.
For SDG SL32015-1, the LCS recoveries for 4-chloroaniline and hexachlorocyclopentadiene were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL32017-1, the LCS recoveries for 4-chloroaniline and hexachlorocyclopentadiene were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL32070-1, the LCS recoveries for 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachloroethane and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL32072-1, the LCS recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorocyclopentadiene, hexachloroethane and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exceptions.

For SDG SL32072-1 the MS/MSD RPDs for benzo(g,h,i)perylene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene were above the acceptance limit. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

CRDLs for WTPH-D and WTPH-G were met.

- **Completeness**

SDGs SL32015-1, SL32017-1, SL32070-1, SL32072-1, GEL465551, GEL465631 and GEL465731 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to MS/MSD and LCS recovery infractions, low surrogate recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL32015-1, SL32017-1, SL32070-1, SL32072-1. GEL465551, GEL465631, GEL465731	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methylnaphthalene, bis(2-chloroethoxy)methane, dibenz(a,h)anthracene, hexachlorobutadiene, hexachlorocyclopentadiene, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol, phenol	UJ	B3KFJ7	Low surrogate recoveries and low matrix spike recoveries
3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylether)ether, bis(2-chloroethyl)ether, hexachloroethane, isophorone	UJ	B3KFJ7	Low surrogate recoveries, low matrix spike recoveries and low LCS recoveries
All other associated SVOC's	UJ	B3KFJ7	Low surrogate recoveries
1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2-nitroaniline, 3,3'-dichlorobenzidine, 3-nitroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-	UJ	B3KFH5, B3KFJ4, B3KFR1, B3KFR4, B3L193, B3KFH8, B3KFJ1, B3L1B0, B3KFH2, B3KFN6, B3KFF9, B3KFN3, B3KFL2, B3KFK9	Low matrix spike recoveries

methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobutadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone, naphthalene, pentachlorophenol			
4-chloroaniline, hexachlorocyclopentadiene	UJ	B3KFH5, B3KFJ4, B3KFR1, B3KFR4, B3L193, B3KFH8, B3KFJ1, B3L1B0, B3KFH2, B3KFN6, B3KFF9, B3KFN3, B3KFL2, B3KFK9	Low matrix spike recoveries and low LCS recoveries
1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachloroethane	UJ	F3KFL8, B3KFN0	Low matrix spike recoveries
4-chloroaniline, hexachlorocyclopentadiene	UJ	F3KFL8, B3KFN0	Low matrix spike recoveries and low LCS recoveries
1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methynaphthalene, bis(2-chloroethoxy)methane, dibenz(a,h)anthracene, hexachlorobutadiene, hexachlorocyclopentadiene, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol,	UJ	B3KFF6, B3KFK6, B3KFK3, B3KFP5, B3KFM4, B3KFL5, B3KFP8, B3L196, B3KFP2, B3KFK0, B3KFM7	Low matrix spike recoveries

phenol			
3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylether)ether, bis(2-chloroethyl)ether, hexachloroethane, isophorone,	UJ	B3KFF6, B3KFK6, B3KFK3, B3KFP5, B3KFM4, B3KFL5, B3KFP8, B3L196, B3KFP2, B3KFK0, B3KFM7	Low matrix spike recoveries and low LCS recoveries
4,6-dinitro-2-methylphenol, bis(2-chloroethoxy)methane, hexachlorobutadiene, nitrobenzene	UJ	B3KFF3, B3KFM1, B3KFN9	Low matrix spike recoveries.
1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane, isophorone	UJ	B3KFF3, B3KFM1, B3KFN9	Low matrix spike recoveries and low LCS recoveries
benzo(g,h,i)perylene	UJ	B3KFF3, B3KFM1, B3KFN9	Low matrix spike recoveries, low LCS recovery, poor MS/MSD precision
indeno(1,2,3-cd)pyrene	UJ	B3KFF3, B3KFM1, B3KFN9	Low matrix spike recovery and poor MS/MSD precision
dibenz(a,h)anthracene	UJ	B3KFF3, B3KFM1, B3KFN9	Low matrix spike recoveries, low LCS recovery and poor MS/MSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: Test America		DATE: 01/22/19	
			SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL32015-1: B3KFH5, B3KFJ4, B3KFR1, B3KFR4, B3L193, B3KFH8, B3KFJ1, B3L1B0, B3KFH2, B3KFN6, B3KFF9, B3KFN3, B3KFL2, B3KFK9,					
SDG SL32017-1: B3KFL8, B3KFN0					
SDG SL32070-1: B3KFF6, B3KFK6, B3KFK3, B3KFP5, B3KFM4, B3KFL5, B3KFP8, B3L196, B3KFJ7, B3KFP2, B3KFK0, B3KFM7,					
SDG SL32072-1: B3KFF3, B3KFM1, B3KFN9,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

SDG SL32015-1: B3KFH5 TBP 67%, NBZ 64%; B3KFN3 TBP 63%, NBZ 67%; B3KFJ1 NBZ 68%; B3KFL2 TBP 67%, NBZ 69%, B3KFK9 TBP 67%; MB TBP 68%

SDG SL32017-1: B3KFL8 NBZ 67%; B3KFN0 TBP 68%, MB TBP 68%

SDG SL32070-1: B3KFF6 NBZ 57%; B3KFF6MS NBZ 67%, B3KFF6MSD TBP 68%, NBZ 66%, PHL 68%; B3KFK6 NBZ 64%; B3KFK3 NBZ 66%, B3KFP5 NBZ 63%, B3KFM4 NBZ 68%, B3KFL5 NBZ 61% B3KFP8 NBZ 60%, B3KFM7 NBZ 64%, B3L196 NBZ 59%, B3KFJ7 TBP 54%, FBP 58%, 2FP 61%, NBZ 47%, PHL 57%, TPHL 66%; B3KFP2 NBZ 63%, B3KFK0 NBZ 67%; MB NBZ 64%

SDG SL32072-1: B3KFF3 TBP 69%, NBZ 64%, B3KFF3MSD NBZ 65%; B3KFM1 NBZ 67%, B3KFN9 0% for all surrogates; MB TBP 67%, NBZ 63%, PHL 69%

LCS and MS/MSD information is on last page

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG SL32072-1: RPD benzo(g,h,i)perylene 108%, dibenz(a,h)anthracene 61%, indeno(1,2,3-cd)pyrene 72%

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix A - (Cont.) Chemical Data Validation Checklist

MS/MSD

SDG SL32015-1: MS/MSD - 1,2,4-trichlorobenzene 67%64%, 1,2-dichlorobenzene 65%/61%, 1,3-dichlorobenzene 60%/57%, 1,4-dichlorobenzene 62%/62%, 2,4-dinitrophenol 56%/54%, 2-nitroaniline 69% (MS), 3,3-dichlorobenzidine 62%/67%, 3-nitroaniline 69% (MS), 4-chloroaniline 58%/58%, benzo(g,h,i)perylene 69%/69%, bis(2 chloro-1-methylethyl)ether 64%/66%, bis(2-chloroethyl)ether 67%/64%, dibenz(a,h)anthracene 67% (MS), hexachlorobutadiene 68% (MSD), hexachlorocyclopentadiene 61%/60%, hexachloroethane 58%/58%, indeno(1,2,3-cd)pyrene 68% (MS), isophorone 69% (MS), naphthalene 69% (MSD) pentachlorophenol 67%/69%

SDG SL32017-1: MS/MSD - 1,2-dichlorobenzene 65% (MS), 1,3-dichlorobenzene 61%/68%, 1,4-dichlorobenzene 63% (MS), 2,4-dinitrophenol 61%/62%, 3,3-dichlorobenzidine 64%/68%, 4-chloroaniline 61%/63%, bis(2 chloro-1-methylethyl)ether 69%(MS), bis(2-chloroethyl)ether 69% (MS), dibenz(a,h)anthracene 69% (MS), hexachlorocyclopentadiene 62%/68%, hexachloroethane 62%/68%

SDG SL32070-1: MS/MSD - 1,2,4-trichlorobenzene 67%/63%, 1,2-dichlorobenzene 66%/62%, 1,3-dichlorobenzene 63%/61%, 1,4-dichlorobenzene 68%/63%, 2,4-dinitrophenol 63% (MSD), 2-chloronaphthalene 69%(MSD), 2-chlorophenol 69% (MSD), 2-methylnaphthalene 69%, 3,3-dichlorobenzidine 63%/59%, 4-chloroaniline 59%/57%, benzo(g,h,i)perylene 52%/50%, bis(2 chloro-1-methylethyl)ether 65%/63%, bis(2-chloroethoxy)methane 69%/67%, bis(2-chloroethyl)ether 62%/59%, dibenz(a,h)anthracene 61%/59%, hexachlorobutadiene 69%/67%, hexachlorocyclopentadiene 65%/61%, hexachloroethane 63%/63%, indeno(1,2,3-cd)pyrene 60%/60%, isophorone 63%/62%, naphthalene 69% (MSD), nitrobenzene 68% (MSD), n-nitrosodi-n-propylamine 68% (MSD), pentachlorophenol 68% (MSD), phenol 67% (MSD)

SDG SL32072-1: MS/MSD - 1,2,4-trichlorobenzene 65% (MSD), 1.2-dichlorobenzene 69%/62%, 1,3-dichlorobenzene 65%/61%, 1,4-dichlorobenzene 68%/61%, 2,4-dinitrophenol 57% (MSD), 3,3-dichlorobenzidine 65%/61%, 4,6-dinitro-2-methylphenol 69% (MSD), 4-chloroaniline 61%/55%, benzo(g,h,i)perylene 51%/171%, bis(2 chloro-1-methylethyl)ether 61% (MSD), bis(2-chloroethoxy)methane 67% (MSD), bis(2-chloroethyl)ether 69%/59%, dibenz(a,h)anthracene 66% (MS), hexachlorobutadiene 67% (MSD), hexachlorocyclopentadiene 66%/55%, hexachloroethane 67%/57%, indeno(1,2,3-cd)pyrene 63%/133%, isophorone 69%/62%, nitrobenzene 67% (MSD)

LCS

SDG SL32015-1: 4-chloroaniline 69%, hexachlorocyclopentadiene 69%,

SDG SL32017-1: 4-chloroaniline 66%, hexachlorocyclopentadiene 69%

SDG SL32070-1: 3,3-dichlorobenzidine 65%, 4-chloroaniline 58%, benzo(g,h,i)perylene 58%, bis(2 chloro-1-methylethyl)ether 69%, bis(2-chloroethyl)ether 66%, hexachloroethane 69%, isophorone 68%

SDG SL32072-1: 1,2,4-trichlorobenzene 69%, 1,2-dichlorobenzene 68%, 1,3-dichlorobenzene 65%, 1,4-dichlorobenzene 68%, 2,4-dinitrophenol 68%, 3,3-dichlorobenzidine 64%, 4-chloroaniline 60%, benzo(g,h,i)perylene 52%, bis(2 chloro-1-methylethyl)ether 69%, bis(2-chloroethyl)ether 62%, dibenz(a,h)anthracene 62%, hexachlorocyclopentadiene 65%, hexachloroethane 68%, isophorone 67%

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/16/19	
			SDG: GEL465551, GEL465631, GEL465731		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	
SAMPLES/MATRIX: Soil					
SDG GEL465551: B3MMX5, B3MMX6, B3MMX7, B3MMX8, B3MMY8, B3MN09, B3MN11					
SDG GEL465631 - B3MMX9, B3MMY0, B3MMY5, B3MMY6, B3MN02, B3MN03, B3MN04, B3MN10					
SDG GEL465731 - B3MMY3, B3MMY2, B3MN01, B3MN06, B3MN12, B3MMY1, B3MN07, B3MMY4, B3MMY9, B3MN05, B3MMX4, B3MMX3, B3MN00, B3MMY7, B3MN08					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	(Yes) No N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.3	U	56.1	47.1	y	ug/Kg	☼	84	62 - 118	21	20
4-Methyl-2-pentanone (MIBK)	2.5	U	56.1	48.7		ug/Kg	☼	87	73 - 125	12	20
Acetone	6.3	U	56.1	47.4		ug/Kg	☼	84	54 - 139	15	20
Benzene	0.25	U	56.1	61.2		ug/Kg	☼	109	80 - 120	18	20
Bromodichloromethane	0.48	U	56.1	54.4		ug/Kg	☼	97	80 - 120	16	20
Bromoform	1.9	U	56.1	59.4	y	ug/Kg	☼	106	80 - 125	23	20
Bromomethane	2.3	U T	56.1	72.5	T	ug/Kg	☼	129	70 - 126	18	20
Carbon disulfide	0.67	U	56.1	63.3		ug/Kg	☼	113	79 - 121	19	20
Carbon tetrachloride	0.50	U	56.1	56.8		ug/Kg	☼	101	80 - 120	17	20
Chlorobenzene	0.79	U	56.1	55.3		ug/Kg	☼	99	80 - 120	19	20
Chloroethane	1.9	U	56.1	68.9		ug/Kg	☼	123	64 - 133	16	20
Chloroform	0.37	U	56.1	55.7		ug/Kg	☼	99	80 - 120	17	20
Chloromethane	0.63	U o T	56.1	69.8	T	ug/Kg	☼	125	75 - 120	17	20
cis-1,3-Dichloropropene	2.1	U	56.1	61.6		ug/Kg	☼	110	80 - 120	18	20
Dibromochloromethane	1.2	U	56.1	52.5		ug/Kg	☼	94	80 - 120	17	20
Ethylbenzene	0.67	U	56.1	55.3		ug/Kg	☼	99	80 - 120	17	20
Methylene Chloride	1.5	U	56.1	60.8		ug/Kg	☼	109	77 - 123	19	20
Styrene	1.9	U	56.1	63.9	y	ug/Kg	☼	114	80 - 120	24	20
Tetrachloroethene	0.55	U	56.1	55.4		ug/Kg	☼	99	80 - 120	10	20
Toluene	2.4	U	56.1	66.3		ug/Kg	☼	118	80 - 124	19	20
trans-1,3-Dichloropropene	1.7	U	56.1	54.4		ug/Kg	☼	97	80 - 122	12	20
Trichloroethene	0.38	U	56.1	60.8		ug/Kg	☼	108	79 - 120	19	20
Vinyl chloride	0.42	U T	56.1	72.1	T	ug/Kg	☼	129	71 - 120	19	20
Xylenes, Total	0.83	U	112	122	y	ug/Kg	☼	109	80 - 120	22	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*94*		*53 - 143*
Toluene-d8 (Surr)	*94*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Picoline	45	U	660	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthylene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acetophenone	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aniline	60	U	330	60	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Anthracene	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aramite	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Carbazole	47	U	330	47	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chrysene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diallate	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenzofuran	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diethylphthalate	82	U	330	82	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dimethoate	100	U	660	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dinoseb	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Disulfoton	41	U	1600	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Famphur	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluoranthene	50	U	330	50	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluorene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloroethane	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isodrin	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isophorone	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isosafrole	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Kepone	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methapyrilene	140	U	1600	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl parathion	120	U	1600	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Naphthalene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Nitrobenzene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Parathion	98	U	1600	98	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenacetin	54	U	660	54	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenanthrene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phorate	37	U	1600	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pronamide	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyrene	73	U	330	73	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyridine	71	U	660	71	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Safrole	33	U	660	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*608*	*N J*	*ug/Kg*		*4.27*	*141-79-7*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*11700*	*N*	*ug/Kg*		*4.61*		*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Pentanone, 4-methoxy-4-methyl-	*649*	*N J*	*ug/Kg*		*5.15*	*107-70-0*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
n-Hexadecanoic acid	*318*	*N J*	*ug/Kg*		*11.00*	*57-10-3*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*191*	*N*	*ug/Kg*		*13.91*		*11/30/18 12:32*	*12/05/18 17:15*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*68*		*47 - 125*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorophenol (Surr)	*80*		*54 - 102*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Nitrobenzene-d5 (Surr)	*70*		*44 - 120*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Phenol-d5 (Surr)	*80*		*51 - 104*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Terphenyl-d14 (Surr)	*87*		*59 - 98*	*11/30/18 12:32*	*12/05/18 17:15*	*1*

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2350		ug/Kg		70	58 - 101
1,2-Dichlorobenzene	3330	2470		ug/Kg		74	57 - 99
1,3-Dichlorobenzene	3330	2350		ug/Kg		70	55 - 98
1,4-Dichlorobenzene	3330	2520		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2650		ug/Kg		79	56 - 109
2,4,6-Trichlorophenol	3330	2770		ug/Kg		83	56 - 110
2,4-Dichlorophenol	3330	2790		ug/Kg		84	57 - 99

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dimethylphenol	3330	2670		ug/Kg		80	53 - 97
2,4-Dinitrophenol	3330	2520		ug/Kg		76	10 - 89
2,4-Dinitrotoluene	3330	2690		ug/Kg		81	54 - 105
2,6-Dinitrotoluene	3330	2630		ug/Kg		79	55 - 105
2-Chloronaphthalene	3330	2670		ug/Kg		80	56 - 111
2-Chlorophenol	3330	2700		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2640		ug/Kg		79	58 - 98
2-Methylphenol	3330	2800		ug/Kg		84	53 - 97
2-Nitroaniline	3330	2700		ug/Kg		81	55 - 108
2-Nitrophenol	3330	2570		ug/Kg		77	59 - 104
3 & 4 Methylphenol	3330	3200		ug/Kg		96	58 - 108
3,3'-Dichlorobenzidine	3330	2450		ug/Kg		73	42 - 104
3-Nitroaniline	3330	2540		ug/Kg		76	43 - 96
4,6-Dinitro-2-methylphenol	3330	2970		ug/Kg		89	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2780		ug/Kg		83	54 - 98
4-Chloroaniline	3330	2190		ug/Kg		66	41 - 83
4-Chlorophenyl phenyl ether	3330	2650		ug/Kg		79	55 - 105
4-Nitroaniline	3330	2870		ug/Kg		86	49 - 99
4-Nitrophenol	3330	2710		ug/Kg		81	48 - 106
Acenaphthene	3330	2730		ug/Kg		82	55 - 106
Acenaphthylene	3330	2680		ug/Kg		80	56 - 109
Anthracene	3330	2900		ug/Kg		87	56 - 103
Benzo[a]anthracene	3330	2870		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2900		ug/Kg		87	57 - 109
Benzo[b]fluoranthene	3330	2860		ug/Kg		86	68 - 109
Benzo[g,h,i]perylene	3330	2490		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2830		ug/Kg		85	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2540		ug/Kg		76	49 - 94
Bis(2-chloroethoxy)methane	3330	2710		ug/Kg		81	56 - 99
Bis(2-chloroethyl)ether	3330	2580		ug/Kg		77	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3120		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	2980		ug/Kg		89	60 - 112
Carbazole	3330	2960		ug/Kg		89	53 - 98
Chrysene	3330	2860		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	2470		ug/Kg		74	52 - 126
Dibenzofuran	3330	2670		ug/Kg		80	55 - 103
Diethylphthalate	3330	2830		ug/Kg		85	54 - 101
Di-n-butyl phthalate	3330	3010		ug/Kg		90	57 - 102
Di-n-octyl phthalate	3330	3300		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3490		ug/Kg		105	63 - 121
Fluoranthene	3330	2930		ug/Kg		88	54 - 100
Fluorene	3330	2780		ug/Kg		83	57 - 106
Hexachlorobenzene	3330	2890		ug/Kg		87	57 - 109
Hexachlorobutadiene	3330	2490		ug/Kg		75	59 - 106
Hexachlorocyclopentadiene	3330	2310		ug/Kg		69	44 - 140
Hexachloroethane	3330	2460		ug/Kg		74	56 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Indeno[1,2,3-cd]pyrene	3330	2550		ug/Kg		76	52 - 132
Isophorone	3330	2550		ug/Kg		76	55 - 96
Naphthalene	3330	2560		ug/Kg		77	57 - 98
Nitrobenzene	3330	2690		ug/Kg		81	58 - 102
N-Nitrosodi-n-propylamine	3330	2990		ug/Kg		90	54 - 98
Pentachlorophenol	3330	2680		ug/Kg		80	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2830		ug/Kg		85	50 - 96
Pyrene	3330	2870		ug/Kg		86	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*80*		*44 - 120*
Phenol-d5 (Surr)	*84*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Lab Sample ID: 160-32015-1 MS
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	35	U	3510	2350		ug/Kg	☼	67	52 - 103
1,2-Dichlorobenzene	37	U	3510	2270		ug/Kg	☼	65	50 - 98
1,3-Dichlorobenzene	39	U	3510	2120		ug/Kg	☼	60	49 - 96
1,4-Dichlorobenzene	40	U	3510	2180		ug/Kg	☼	62	50 - 96
2,4,5-Trichlorophenol	55	U	3510	2560		ug/Kg	☼	73	41 - 116
2,4,6-Trichlorophenol	49	U	3510	2650		ug/Kg	☼	76	40 - 115
2,4-Dichlorophenol	42	U	3510	2740		ug/Kg	☼	78	47 - 104
2,4-Dimethylphenol	59	U	3510	2610		ug/Kg	☼	74	45 - 105
2,4-Dinitrophenol	350	U	3510	1950		ug/Kg	☼	56	10 - 100
2,4-Dinitrotoluene	130	U	3510	2690		ug/Kg	☼	77	42 - 113
2,6-Dinitrotoluene	66	U	3510	2620		ug/Kg	☼	75	46 - 109
2-Chloronaphthalene	40	U	3510	2580		ug/Kg	☼	74	52 - 108
2-Chlorophenol	40	U	3510	2640		ug/Kg	☼	75	48 - 102
2-Methylnaphthalene	43	U	3510	2600		ug/Kg	☼	74	55 - 97
2-Methylphenol	45	U	3510	2590		ug/Kg	☼	74	46 - 98
2-Nitroaniline	130	U	3510	2430		ug/Kg	☼	69	45 - 111
2-Nitrophenol	150	U	3510	2570		ug/Kg	☼	73	38 - 115
3 & 4 Methylphenol	71	U	3510	3040		ug/Kg	☼	87	48 - 111
3,3'-Dichlorobenzidine	120	U	3510	2180		ug/Kg	☼	62	23 - 102
3-Nitroaniline	110	U	3510	2420		ug/Kg	☼	69	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3510	2690		ug/Kg	☼	77	15 - 118
4-Bromophenyl phenyl ether	52	U	3510	2630		ug/Kg	☼	75	53 - 110
4-Chloro-3-methylphenol	45	U	3510	2650		ug/Kg	☼	76	36 - 111
4-Chloroaniline	49	U	3510	2050		ug/Kg	☼	58	32 - 79
4-Chlorophenyl phenyl ether	46	U	3510	2600		ug/Kg	☼	74	51 - 103

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32015-1 MS
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitroaniline	79	U	3510	2580		ug/Kg	☼	74	36 - 102
4-Nitrophenol	350	U	3510	2660		ug/Kg	☼	76	40 - 113
Acenaphthene	37	U	3510	2670		ug/Kg	☼	76	53 - 105
Acenaphthylene	49	U	3510	2600		ug/Kg	☼	74	55 - 107
Anthracene	52	U	3510	2770		ug/Kg	☼	79	55 - 103
Benzo[a]anthracene	63	U	3510	2740		ug/Kg	☼	78	48 - 112
Benzo[a]pyrene	95	U	3510	2620		ug/Kg	☼	75	46 - 117
Benzo[b]fluoranthene	35	U	3510	2630		ug/Kg	☼	75	45 - 125
Benzo[g,h,i]perylene	35	U	3510	2400		ug/Kg	☼	69	24 - 134
Benzo[k]fluoranthene	85	U	3510	2570		ug/Kg	☼	73	43 - 114
bis(2 chloro-1-methylethyl) ether	44	U	3510	2250		ug/Kg	☼	64	38 - 98
Bis(2-chloroethoxy)methane	40	U	3510	2580		ug/Kg	☼	73	49 - 100
Bis(2-chloroethyl)ether	35	U	3510	2330		ug/Kg	☼	67	49 - 100
Bis(2-ethylhexyl) phthalate	90	U	3510	2810		ug/Kg	☼	80	50 - 113
Butyl benzyl phthalate	98	U	3510	2800		ug/Kg	☼	80	54 - 112
Carbazole	50	U	3510	2810		ug/Kg	☼	80	47 - 102
Chrysene	48	U	3510	2700		ug/Kg	☼	77	45 - 115
Dibenz(a,h)anthracene	70	U	3510	2370		ug/Kg	☼	67	30 - 134
Dibenzofuran	43	U	3510	2620		ug/Kg	☼	75	50 - 102
Diethylphthalate	87	U	3510	2700		ug/Kg	☼	77	46 - 107
Di-n-butyl phthalate	68	U	3510	2850		ug/Kg	☼	81	49 - 107
Di-n-octyl phthalate	140	U	3510	2990		ug/Kg	☼	85	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	35	U	3510	3220		ug/Kg	☼	92	33 - 140
Fluoranthene	53	U	3510	2810		ug/Kg	☼	80	45 - 109
Fluorene	48	U	3510	2720		ug/Kg	☼	78	45 - 109
Hexachlorobenzene	45	U	3510	2760		ug/Kg	☼	79	48 - 113
Hexachlorobutadiene	42	U	3510	2440		ug/Kg	☼	70	48 - 109
Hexachlorocyclopentadiene	350	U	3510	2150		ug/Kg	☼	61	21 - 144
Hexachloroethane	37	U	3510	2040		ug/Kg	☼	58	44 - 102
Indeno[1,2,3-cd]pyrene	67	U	3510	2390		ug/Kg	☼	68	30 - 136
Isophorone	40	U	3510	2410		ug/Kg	☼	69	48 - 100
Naphthalene	38	U	3510	2480		ug/Kg	☼	71	54 - 98
Nitrobenzene	43	U	3510	2530		ug/Kg	☼	72	51 - 106
N-Nitrosodi-n-propylamine	43	U	3510	2660		ug/Kg	☼	76	47 - 104
Pentachlorophenol	350	U	3510	2350		ug/Kg	☼	67	23 - 116
Phenanthrene	45	U	3510	2820		ug/Kg	☼	80	53 - 106
Phenol	40	U	3510	2720		ug/Kg	☼	78	41 - 100
Pyrene	77	U	3510	2740		ug/Kg	☼	78	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*75*		*47 - 125*
2-Fluorobiphenyl (Surr)	*76*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*73*		*44 - 120*
Phenol-d5 (Surr)	*77*		*51 - 104*
Terphenyl-d14 (Surr)	*81*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	35	U	3510	2250		ug/Kg	☼	64	52 - 103	4	30
1,2-Dichlorobenzene	37	U	3510	2160		ug/Kg	☼	61	50 - 98	5	30
1,3-Dichlorobenzene	39	U	3510	1990		ug/Kg	☼	57	49 - 96	6	30
1,4-Dichlorobenzene	40	U	3510	2170		ug/Kg	☼	62	50 - 96	0	30
2,4,5-Trichlorophenol	55	U	3510	2590		ug/Kg	☼	74	41 - 116	1	30
2,4,6-Trichlorophenol	49	U	3510	2640		ug/Kg	☼	75	40 - 115	1	30
2,4-Dichlorophenol	42	U	3510	2780		ug/Kg	☼	79	47 - 104	2	30
2,4-Dimethylphenol	59	U	3510	2630		ug/Kg	☼	75	45 - 105	1	30
2,4-Dinitrophenol	350	U	3510	1880		ug/Kg	☼	54	10 - 100	4	30
2,4-Dinitrotoluene	130	U	3510	2620		ug/Kg	☼	75	42 - 113	3	30
2,6-Dinitrotoluene	66	U	3510	2650		ug/Kg	☼	75	46 - 109	1	30
2-Chloronaphthalene	40	U	3510	2560		ug/Kg	☼	73	52 - 108	1	30
2-Chlorophenol	40	U	3510	2610		ug/Kg	☼	74	48 - 102	1	30
2-Methylnaphthalene	43	U	3510	2570		ug/Kg	☼	73	55 - 97	1	30
2-Methylphenol	45	U	3510	2540		ug/Kg	☼	72	46 - 98	2	30
2-Nitroaniline	130	U	3510	2610		ug/Kg	☼	74	45 - 111	7	30
2-Nitrophenol	150	U	3510	2560		ug/Kg	☼	73	38 - 115	0	30
3 & 4 Methylphenol	71	U	3510	3080		ug/Kg	☼	88	48 - 111	1	30
3,3'-Dichlorobenzidine	120	U	3510	2340		ug/Kg	☼	67	23 - 102	7	30
3-Nitroaniline	110	U	3510	2470		ug/Kg	☼	70	32 - 95	2	30
4,6-Dinitro-2-methylphenol	350	U	3510	2750		ug/Kg	☼	78	15 - 118	2	30
4-Bromophenyl phenyl ether	52	U	3510	2860		ug/Kg	☼	81	53 - 110	8	30
4-Chloro-3-methylphenol	45	U	3510	2660		ug/Kg	☼	76	36 - 111	0	30
4-Chloroaniline	49	U	3510	2030		ug/Kg	☼	58	32 - 79	1	30
4-Chlorophenyl phenyl ether	46	U	3510	2550		ug/Kg	☼	73	51 - 103	2	30
4-Nitroaniline	79	U	3510	2720		ug/Kg	☼	77	36 - 102	5	30
4-Nitrophenol	350	U	3510	2620		ug/Kg	☼	75	40 - 113	1	30
Acenaphthene	37	U	3510	2620		ug/Kg	☼	74	53 - 105	2	30
Acenaphthylene	49	U	3510	2600		ug/Kg	☼	74	55 - 107	0	30
Anthracene	52	U	3510	2860		ug/Kg	☼	81	55 - 103	3	30
Benzo[a]anthracene	63	U	3510	2820		ug/Kg	☼	80	48 - 112	3	30
Benzo[a]pyrene	95	U	3510	2720		ug/Kg	☼	78	46 - 117	4	30
Benzo[b]fluoranthene	35	U	3510	2750		ug/Kg	☼	78	45 - 125	4	30
Benzo[g,h,i]perylene	35	U	3510	2430		ug/Kg	☼	69	24 - 134	1	30
Benzo[k]fluoranthene	85	U	3510	2690		ug/Kg	☼	77	43 - 114	4	30
bis(2 chloro-1-methylethyl) ether	44	U	3510	2320		ug/Kg	☼	66	38 - 98	3	30
Bis(2-chloroethoxy)methane	40	U	3510	2680		ug/Kg	☼	76	49 - 100	4	30
Bis(2-chloroethyl)ether	35	U	3510	2260		ug/Kg	☼	64	49 - 100	3	30
Bis(2-ethylhexyl) phthalate	90	U	3510	3020		ug/Kg	☼	86	50 - 113	7	30
Butyl benzyl phthalate	98	U	3510	2950		ug/Kg	☼	84	54 - 112	5	30
Carbazole	50	U	3510	2940		ug/Kg	☼	84	47 - 102	5	30
Chrysene	48	U	3510	2820		ug/Kg	☼	80	45 - 115	4	30
Dibenz(a,h)anthracene	70	U	3510	2450		ug/Kg	☼	70	30 - 134	3	30
Dibenzofuran	43	U	3510	2610		ug/Kg	☼	74	50 - 102	0	30
Diethylphthalate	87	U	3510	2760		ug/Kg	☼	79	46 - 107	2	30
Di-n-butyl phthalate	68	U	3510	2960		ug/Kg	☼	84	49 - 107	4	30
Di-n-octyl phthalate	140	U	3510	3160		ug/Kg	☼	90	35 - 125	6	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	35	U	3510	3310		ug/Kg	☼	94	33 - 140	3	30
Fluoranthene	53	U	3510	2850		ug/Kg	☼	81	45 - 109	2	30
Fluorene	48	U	3510	2710		ug/Kg	☼	77	45 - 109	0	30
Hexachlorobenzene	45	U	3510	2820		ug/Kg	☼	80	48 - 113	2	30
Hexachlorobutadiene	42	U	3510	2400		ug/Kg	☼	68	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3510	2100		ug/Kg	☼	60	21 - 144	2	30
Hexachloroethane	37	U	3510	2040		ug/Kg	☼	58	44 - 102	0	30
Indeno[1,2,3-cd]pyrene	67	U	3510	2490		ug/Kg	☼	71	30 - 136	4	30
Isophorone	40	U	3510	2460		ug/Kg	☼	70	48 - 100	2	30
Naphthalene	38	U	3510	2430		ug/Kg	☼	69	54 - 98	2	30
Nitrobenzene	43	U	3510	2620		ug/Kg	☼	75	51 - 106	3	30
N-Nitrosodi-n-propylamine	43	U	3510	2710		ug/Kg	☼	77	47 - 104	2	30
Pentachlorophenol	350	U	3510	2430		ug/Kg	☼	69	23 - 116	3	30
Phenanthrene	45	U	3510	2860		ug/Kg	☼	81	53 - 106	1	30
Phenol	40	U	3510	2670		ug/Kg	☼	76	41 - 100	2	30
Pyrene	77	U	3510	2840		ug/Kg	☼	81	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*74*		*47 - 125*
2-Fluorobiphenyl (Surr)	*76*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*81*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32015-1	B3KFH5	93	124	92	102
160-32015-1 MS	B3KFH5	92	103	98	104
160-32015-1 MSD	B3KFH5	87	101	94	94
160-32015-2	B3KFJ4	89	106	92	126
160-32015-3	B3KFR1	100	102	104	99
160-32015-4	B3KFR4	99	108	101	109
160-32015-5	B3KFN3	105	103	106	92
160-32015-6	B3L193	97	103	112	100
160-32015-7	B3KFH8	100	126	101	99
160-32015-8	B3KFJ1	108	117	105	98
160-32015-9	B3L1B0	110	126	108	107
160-32015-10	B3KFH2	106	104	101	118
160-32015-17	B3KFL2	98	101	94	116
160-32015-18	B3KFN6	103	108	97	103
160-32015-19	B3KFF9	102	112	113	111
160-32015-20	B3KFK9	115	109	111	109

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-404776/5	Lab Control Sample	90	105	105	111
LCSD 160-404776/6	Lab Control Sample Dup	93	104	99	92
MB 160-404776/8	Method Blank	95	111	102	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32015-1	B3KFH5	67	76	73	64	73	80
160-32015-1 MS	B3KFH5	75	76	77	73	77	81
160-32015-1 MSD	B3KFH5	74	76	77	74	76	81
160-32015-2	B3KFJ4	76	85	85	73	87	90
160-32015-3	B3KFR1	72	83	82	70	84	85

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32015-4	B3KFR4	79	80	78	70	78	84
160-32015-5 - DL	B3KFN3	63	79	75	67	77	88
160-32015-6	B3L193	83	87	88	74	89	91
160-32015-7	B3KFH8	81	84	82	71	83	87
160-32015-8	B3KFJ1	75	79	76	68	77	84
160-32015-9	B3L1B0	73	86	88	75	90	88
160-32015-10	B3KFH2	81	84	79	72	81	86
160-32015-17 - DL	B3KFL2	67	79	78	69	80	82
160-32015-18	B3KFN6	77	82	83	72	84	92
160-32015-19	B3KFF9	73	79	79	70	82	84
160-32015-20 - DL	B3KFK9	67	81	82	72	84	91

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32015-11	B3L192	85	81
160-32015-11 MS	B3L192	86	82
160-32015-11 MSD	B3L192	89	83
160-32015-12	B3KFH7	83	78
160-32015-13	B3KFL7	91	84
160-32015-14	B3KFJ3	93	88
160-32015-15	B3KFN5	86	81

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32017-2 MSD
Matrix: Soil
Analysis Batch: 404776

Client Sample ID: B3KFN0
Prep Type: Total/NA
Prep Batch: 404781

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorobenzene	0.79	U	53.7	55.7		ug/Kg	☼	104	80 - 120	2	20
Chloroethane	1.9	U	53.7	68.4		ug/Kg	☼	127	64 - 133	2	20
Chloroform	0.37	U	53.7	55.5		ug/Kg	☼	103	80 - 120	1	20
Chloromethane	0.63	U o T	53.7	69.4	T	ug/Kg	☼	129	75 - 120	0	20
cis-1,3-Dichloropropene	2.1	U T	53.7	60.4		ug/Kg	☼	112	80 - 120	10	20
Dibromochloromethane	1.2	U	53.7	53.1		ug/Kg	☼	99	80 - 120	9	20
Ethylbenzene	0.67	U	53.7	59.4		ug/Kg	☼	111	80 - 120	8	20
Methylene Chloride	1.5	U	53.7	59.8		ug/Kg	☼	111	77 - 123	0	20
Styrene	1.9	U	53.7	63.4		ug/Kg	☼	118	80 - 120	19	20
Tetrachloroethene	0.55	U	53.7	55.8		ug/Kg	☼	104	80 - 120	1	20
Toluene	2.5	U	53.7	62.0		ug/Kg	☼	115	80 - 124	3	20
trans-1,3-Dichloropropene	1.7	U	53.7	55.0		ug/Kg	☼	102	80 - 122	7	20
Trichloroethene	0.38	U T	53.7	62.1		ug/Kg	☼	116	79 - 120	7	20
Vinyl chloride	0.42	U T	53.7	71.5	T	ug/Kg	☼	133	71 - 120	1	20
Xylenes, Total	0.83	U	107	125		ug/Kg	☼	116	80 - 120	17	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*115*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chlorophenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Picoline	45	U	660	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthylene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acetophenone	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aniline	60	U	330	60	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Anthracene	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aramite	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Carbazole	47	U	330	47	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chrysene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diallate	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenzofuran	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diethylphthalate	82	U	330	82	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dimethoate	100	U	660	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dinoseb	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Disulfoton	41	U	1600	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Famphur	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluoranthene	50	U	330	50	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluorene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloroethane	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isodrin	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isophorone	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isosafrole	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Kepone	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methapyrilene	140	U	1600	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl parathion	120	U	1600	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Naphthalene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Nitrobenzene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
o-Toluidine	51	U	330	51	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Parathion	98	U	1600	98	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenacetin	54	U	660	54	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenanthrene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phorate	37	U	1600	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pronamide	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyrene	73	U	330	73	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyridine	71	U	660	71	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Safrole	33	U	660	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*608*	*N J*	*ug/Kg*		*4.27*	*141-79-7*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*11700*	*N*	*ug/Kg*		*4.61*		*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Pentanone, 4-methoxy-4-methyl-	*649*	*N J*	*ug/Kg*		*5.15*	*107-70-0*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
n-Hexadecanoic acid	*318*	*N J*	*ug/Kg*		*11.00*	*57-10-3*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*191*	*N*	*ug/Kg*		*13.91*		*11/30/18 12:32*	*12/05/18 17:15*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*68*		*47 - 125*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorophenol (Surr)	*80*		*54 - 102*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Nitrobenzene-d5 (Surr)	*70*		*44 - 120*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Phenol-d5 (Surr)	*80*		*51 - 104*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Terphenyl-d14 (Surr)	*87*		*59 - 98*	*11/30/18 12:32*	*12/05/18 17:15*	*1*

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2350		ug/Kg		70	58 - 101
1,2-Dichlorobenzene	3330	2470		ug/Kg		74	57 - 99
1,3-Dichlorobenzene	3330	2350		ug/Kg		70	55 - 98
1,4-Dichlorobenzene	3330	2520		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2650		ug/Kg		79	56 - 109
2,4,6-Trichlorophenol	3330	2770		ug/Kg		83	56 - 110
2,4-Dichlorophenol	3330	2790		ug/Kg		84	57 - 99
2,4-Dimethylphenol	3330	2670		ug/Kg		80	53 - 97
2,4-Dinitrophenol	3330	2520		ug/Kg		76	10 - 89
2,4-Dinitrotoluene	3330	2690		ug/Kg		81	54 - 105
2,6-Dinitrotoluene	3330	2630		ug/Kg		79	55 - 105
2-Chloronaphthalene	3330	2670		ug/Kg		80	56 - 111
2-Chlorophenol	3330	2700		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2640		ug/Kg		79	58 - 98
2-Methylphenol	3330	2800		ug/Kg		84	53 - 97
2-Nitroaniline	3330	2700		ug/Kg		81	55 - 108

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitrophenol	3330	2570		ug/Kg		77	59 - 104
3 & 4 Methylphenol	3330	3200		ug/Kg		96	58 - 108
3,3'-Dichlorobenzidine	3330	2450		ug/Kg		73	42 - 104
3-Nitroaniline	3330	2540		ug/Kg		76	43 - 96
4,6-Dinitro-2-methylphenol	3330	2970		ug/Kg		89	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2780		ug/Kg		83	54 - 98
4-Chloroaniline	3330	2190		ug/Kg		66	41 - 83
4-Chlorophenyl phenyl ether	3330	2650		ug/Kg		79	55 - 105
4-Nitroaniline	3330	2870		ug/Kg		86	49 - 99
4-Nitrophenol	3330	2710		ug/Kg		81	48 - 106
Acenaphthene	3330	2730		ug/Kg		82	55 - 106
Acenaphthylene	3330	2680		ug/Kg		80	56 - 109
Anthracene	3330	2900		ug/Kg		87	56 - 103
Benzo[a]anthracene	3330	2870		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2900		ug/Kg		87	57 - 109
Benzo[b]fluoranthene	3330	2860		ug/Kg		86	68 - 109
Benzo[g,h,i]perylene	3330	2490		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2830		ug/Kg		85	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2540		ug/Kg		76	49 - 94
Bis(2-chloroethoxy)methane	3330	2710		ug/Kg		81	56 - 99
Bis(2-chloroethyl)ether	3330	2580		ug/Kg		77	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3120		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	2980		ug/Kg		89	60 - 112
Carbazole	3330	2960		ug/Kg		89	53 - 98
Chrysene	3330	2860		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	2470		ug/Kg		74	52 - 126
Dibenzofuran	3330	2670		ug/Kg		80	55 - 103
Diethylphthalate	3330	2830		ug/Kg		85	54 - 101
Di-n-butyl phthalate	3330	3010		ug/Kg		90	57 - 102
Di-n-octyl phthalate	3330	3300		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3490		ug/Kg		105	63 - 121
Fluoranthene	3330	2930		ug/Kg		88	54 - 100
Fluorene	3330	2780		ug/Kg		83	57 - 106
Hexachlorobenzene	3330	2890		ug/Kg		87	57 - 109
Hexachlorobutadiene	3330	2490		ug/Kg		75	59 - 106
Hexachlorocyclopentadiene	3330	2310		ug/Kg		69	44 - 140
Hexachloroethane	3330	2460		ug/Kg		74	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2550		ug/Kg		76	52 - 132
Isophorone	3330	2550		ug/Kg		76	55 - 96
Naphthalene	3330	2560		ug/Kg		77	57 - 98
Nitrobenzene	3330	2690		ug/Kg		81	58 - 102
N-Nitrosodi-n-propylamine	3330	2990		ug/Kg		90	54 - 98
Pentachlorophenol	3330	2680		ug/Kg		80	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2830		ug/Kg		85	50 - 96
Pyrene	3330	2870		ug/Kg		86	59 - 109

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*80*		*44 - 120*
Phenol-d5 (Surr)	*84*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Lab Sample ID: 160-32017-1 MS
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	35	U	3540	2460		ug/Kg	☼	70	52 - 103
1,2-Dichlorobenzene	37	U	3540	2290		ug/Kg	☼	65	50 - 98
1,3-Dichlorobenzene	39	U	3540	2170		ug/Kg	☼	61	49 - 96
1,4-Dichlorobenzene	40	U	3540	2250		ug/Kg	☼	63	50 - 96
2,4,5-Trichlorophenol	56	U	3540	2750		ug/Kg	☼	78	41 - 116
2,4,6-Trichlorophenol	49	U	3540	2930		ug/Kg	☼	83	40 - 115
2,4-Dichlorophenol	42	U	3540	3020		ug/Kg	☼	85	47 - 104
2,4-Dimethylphenol	59	U	3540	2960		ug/Kg	☼	84	45 - 105
2,4-Dinitrophenol	350	U	3540	2180		ug/Kg	☼	61	10 - 100
2,4-Dinitrotoluene	130	U	3540	2820		ug/Kg	☼	80	42 - 113
2,6-Dinitrotoluene	66	U	3540	2790		ug/Kg	☼	79	46 - 109
2-Chloronaphthalene	40	U	3540	2780		ug/Kg	☼	78	52 - 108
2-Chlorophenol	41	U	3540	2810		ug/Kg	☼	79	48 - 102
2-Methylnaphthalene	43	U	3540	2800		ug/Kg	☼	79	55 - 97
2-Methylphenol	45	U	3540	2750		ug/Kg	☼	78	46 - 98
2-Nitroaniline	130	U	3540	2660		ug/Kg	☼	75	45 - 111
2-Nitrophenol	150	U	3540	2820		ug/Kg	☼	80	38 - 115
3 & 4 Methylphenol	71	U	3540	3240		ug/Kg	☼	91	48 - 111
3,3'-Dichlorobenzidine	120	U	3540	2270		ug/Kg	☼	64	23 - 102
3-Nitroaniline	110	U	3540	2510		ug/Kg	☼	71	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3540	2720		ug/Kg	☼	77	15 - 118
4-Bromophenyl phenyl ether	52	U	3540	2910		ug/Kg	☼	82	53 - 110
4-Chloro-3-methylphenol	45	U	3540	2970		ug/Kg	☼	84	36 - 111
4-Chloroaniline	49	U	3540	2150		ug/Kg	☼	61	32 - 79
4-Chlorophenyl phenyl ether	46	U	3540	2820		ug/Kg	☼	80	51 - 103
4-Nitroaniline	79	U	3540	2930		ug/Kg	☼	83	36 - 102
4-Nitrophenol	350	U	3540	2790		ug/Kg	☼	79	40 - 113
Acenaphthene	37	U	3540	2820		ug/Kg	☼	79	53 - 105
Acenaphthylene	49	U	3540	2760		ug/Kg	☼	78	55 - 107
Anthracene	52	U	3540	2930		ug/Kg	☼	83	55 - 103
Benzo[a]anthracene	63	U	3540	2940		ug/Kg	☼	83	48 - 112
Benzo[a]pyrene	95	U	3540	2880		ug/Kg	☼	81	46 - 117
Benzo[b]fluoranthene	35	U	3540	2880		ug/Kg	☼	81	45 - 125
Benzo[g,h,i]perylene	35	U	3540	2510		ug/Kg	☼	71	24 - 134
Benzo[k]fluoranthene	85	U	3540	2880		ug/Kg	☼	81	43 - 114
bis(2 chloro-1-methylethyl) ether	45	U	3540	2430		ug/Kg	☼	69	38 - 98

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32017-1 MS
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-chloroethoxy)methane	40	U	3540	2850		ug/Kg	☼	80	49 - 100
Bis(2-chloroethyl)ether	36	U	3540	2450		ug/Kg	☼	69	49 - 100
Bis(2-ethylhexyl) phthalate	91	U	3540	3170		ug/Kg	☼	89	50 - 113
Butyl benzyl phthalate	99	U	3540	3100		ug/Kg	☼	88	54 - 112
Carbazole	50	U	3540	3040		ug/Kg	☼	86	47 - 102
Chrysene	48	U	3540	2940		ug/Kg	☼	83	45 - 115
Dibenz(a,h)anthracene	70	U	3540	2440		ug/Kg	☼	69	30 - 134
Dibenzofuran	43	U	3540	2850		ug/Kg	☼	80	50 - 102
Diethylphthalate	87	U	3540	3000		ug/Kg	☼	85	46 - 107
Di-n-butyl phthalate	68	U	3540	3070		ug/Kg	☼	87	49 - 107
Di-n-octyl phthalate	140	U	3540	3350		ug/Kg	☼	95	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	35	U	3540	3480		ug/Kg	☼	98	33 - 140
Fluoranthene	54	U	3540	2960		ug/Kg	☼	83	45 - 109
Fluorene	49	U	3540	2930		ug/Kg	☼	83	45 - 109
Hexachlorobenzene	45	U	3540	2840		ug/Kg	☼	80	48 - 113
Hexachlorobutadiene	43	U	3540	2660		ug/Kg	☼	75	48 - 109
Hexachlorocyclopentadiene	350	U	3540	2210		ug/Kg	☼	62	21 - 144
Hexachloroethane	37	U	3540	2210		ug/Kg	☼	62	44 - 102
Indeno[1,2,3-cd]pyrene	67	U	3540	2520		ug/Kg	☼	71	30 - 136
Isophorone	40	U	3540	2680		ug/Kg	☼	76	48 - 100
Naphthalene	38	U	3540	2670		ug/Kg	☼	75	54 - 98
Nitrobenzene	43	U	3540	2840		ug/Kg	☼	80	51 - 106
N-Nitrosodi-n-propylamine	43	U	3540	2840		ug/Kg	☼	80	47 - 104
Pentachlorophenol	350	U	3540	2580		ug/Kg	☼	73	23 - 116
Phenanthrene	45	U	3540	2940		ug/Kg	☼	83	53 - 106
Phenol	40	U	3540	2800		ug/Kg	☼	79	41 - 100
Pyrene	78	U	3540	2980		ug/Kg	☼	84	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*79*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*81*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*81*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

Lab Sample ID: 160-32017-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	35	U	3520	2610		ug/Kg	☼	74	52 - 103	6	30
1,2-Dichlorobenzene	37	U	3520	2540		ug/Kg	☼	72	50 - 98	10	30
1,3-Dichlorobenzene	39	U	3520	2380		ug/Kg	☼	68	49 - 96	9	30
1,4-Dichlorobenzene	40	U	3520	2470		ug/Kg	☼	70	50 - 96	9	30
2,4,5-Trichlorophenol	56	U	3520	2960		ug/Kg	☼	84	41 - 116	7	30
2,4,6-Trichlorophenol	49	U	3520	3030		ug/Kg	☼	86	40 - 115	3	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32017-1 MSD | **Client Sample ID: B3KFL8**
Matrix: Soil | **Prep Type: Total/NA**
Analysis Batch: 404279 | **Prep Batch: 403615**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4-Dichlorophenol	42	U	3520	3050		ug/Kg	☼	87	47 - 104	1	30
2,4-Dimethylphenol	59	U	3520	2830		ug/Kg	☼	80	45 - 105	4	30
2,4-Dinitrophenol	350	U	3520	2190		ug/Kg	☼	62	10 - 100	1	30
2,4-Dinitrotoluene	130	U	3520	3090		ug/Kg	☼	88	42 - 113	9	30
2,6-Dinitrotoluene	66	U	3520	3040		ug/Kg	☼	86	46 - 109	9	30
2-Chloronaphthalene	40	U	3520	2850		ug/Kg	☼	81	52 - 108	3	30
2-Chlorophenol	41	U	3520	2950		ug/Kg	☼	84	48 - 102	5	30
2-Methylnaphthalene	43	U	3520	2840		ug/Kg	☼	81	55 - 97	1	30
2-Methylphenol	45	U	3520	2930		ug/Kg	☼	83	46 - 98	6	30
2-Nitroaniline	130	U	3520	2780		ug/Kg	☼	79	45 - 111	4	30
2-Nitrophenol	150	U	3520	2940		ug/Kg	☼	83	38 - 115	4	30
3 & 4 Methylphenol	71	U	3520	3410		ug/Kg	☼	97	48 - 111	5	30
3,3'-Dichlorobenzidine	120	U	3520	2400		ug/Kg	☼	68	23 - 102	6	30
3-Nitroaniline	110	U	3520	2760		ug/Kg	☼	78	32 - 95	9	30
4,6-Dinitro-2-methylphenol	350	U	3520	2870		ug/Kg	☼	82	15 - 118	5	30
4-Bromophenyl phenyl ether	52	U	3520	2960		ug/Kg	☼	84	53 - 110	2	30
4-Chloro-3-methylphenol	45	U	3520	3070		ug/Kg	☼	87	36 - 111	3	30
4-Chloroaniline	49	U	3520	2220		ug/Kg	☼	63	32 - 79	3	30
4-Chlorophenyl phenyl ether	46	U	3520	2950		ug/Kg	☼	84	51 - 103	4	30
4-Nitroaniline	79	U	3520	3080		ug/Kg	☼	87	36 - 102	5	30
4-Nitrophenol	350	U	3520	2990		ug/Kg	☼	85	40 - 113	7	30
Acenaphthene	37	U	3520	2950		ug/Kg	☼	84	53 - 105	5	30
Acenaphthylene	49	U	3520	2920		ug/Kg	☼	83	55 - 107	6	30
Anthracene	52	U	3520	3040		ug/Kg	☼	86	55 - 103	4	30
Benzo[a]anthracene	63	U	3520	3020		ug/Kg	☼	86	48 - 112	3	30
Benzo[a]pyrene	95	U	3520	3040		ug/Kg	☼	86	46 - 117	5	30
Benzo[b]fluoranthene	35	U	3520	3080		ug/Kg	☼	88	45 - 125	7	30
Benzo[g,h,i]perylene	35	U	3520	2660		ug/Kg	☼	76	24 - 134	6	30
Benzo[k]fluoranthene	85	U	3520	2990		ug/Kg	☼	85	43 - 114	4	30
bis(2 chloro-1-methylethyl) ether	45	U	3520	2480		ug/Kg	☼	71	38 - 98	2	30
Bis(2-chloroethoxy)methane	40	U	3520	2850		ug/Kg	☼	81	49 - 100	0	30
Bis(2-chloroethyl)ether	36	U	3520	2560		ug/Kg	☼	73	49 - 100	4	30
Bis(2-ethylhexyl) phthalate	91	U	3520	3240		ug/Kg	☼	92	50 - 113	2	30
Butyl benzyl phthalate	99	U	3520	3140		ug/Kg	☼	89	54 - 112	1	30
Carbazole	50	U	3520	3140		ug/Kg	☼	89	47 - 102	3	30
Chrysene	48	U	3520	3030		ug/Kg	☼	86	45 - 115	3	30
Dibenz(a,h)anthracene	70	U	3520	2550		ug/Kg	☼	72	30 - 134	4	30
Dibenzofuran	43	U	3520	2960		ug/Kg	☼	84	50 - 102	4	30
Diethylphthalate	87	U	3520	3190		ug/Kg	☼	91	46 - 107	6	30
Di-n-butyl phthalate	68	U	3520	3180		ug/Kg	☼	90	49 - 107	3	30
Di-n-octyl phthalate	140	U	3520	3420		ug/Kg	☼	97	35 - 125	2	30
Diphenylamine + N-Nitrosodiphenylamine	35	U	3520	3600		ug/Kg	☼	102	33 - 140	3	30
Fluoranthene	54	U	3520	3070		ug/Kg	☼	87	45 - 109	4	30
Fluorene	49	U	3520	3110		ug/Kg	☼	88	45 - 109	6	30
Hexachlorobenzene	45	U	3520	3090		ug/Kg	☼	88	48 - 113	9	30
Hexachlorobutadiene	43	U	3520	2670		ug/Kg	☼	76	48 - 109	0	30
Hexachlorocyclopentadiene	350	U	3520	2400		ug/Kg	☼	68	21 - 144	8	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32017-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexachloroethane	37	U	3520	2310		ug/Kg	☼	66	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	67	U	3520	2630		ug/Kg	☼	75	30 - 136	4	30
Isophorone	40	U	3520	2650		ug/Kg	☼	75	48 - 100	1	30
Naphthalene	38	U	3520	2720		ug/Kg	☼	77	54 - 98	2	30
Nitrobenzene	43	U	3520	2870		ug/Kg	☼	81	51 - 106	1	30
N-Nitrosodi-n-propylamine	43	U	3520	2960		ug/Kg	☼	84	47 - 104	4	30
Pentachlorophenol	350	U	3520	2740		ug/Kg	☼	78	23 - 116	6	30
Phenanthrene	45	U	3520	3070		ug/Kg	☼	87	53 - 106	4	30
Phenol	40	U	3520	2960		ug/Kg	☼	84	41 - 100	5	30
Pyrene	78	U	3520	3110		ug/Kg	☼	88	39 - 130	4	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*83*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*80*		*44 - 120*
Phenol-d5 (Surr)	*87*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Toxaphene	23	U	67	23	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32017-1	B3KFL8	122	114	97	104
160-32017-1 MS	B3KFL8	103	109	104	107
160-32017-1 MSD	B3KFL8	97	105	101	104
160-32017-2	B3KFN0	94	101	103	86
160-32017-2 MS	B3KFN0	100	108	100	104
160-32017-2 MSD	B3KFN0	93	115	98	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-404683/4	Lab Control Sample	106	105	106	102
LCS 160-404776/5	Lab Control Sample	90	105	105	111
LCSD 160-404683/5	Lab Control Sample Dup	98	105	103	105
LCSD 160-404776/6	Lab Control Sample Dup	93	104	99	92
MB 160-404683/7	Method Blank	103	105	104	105
MB 160-404776/8	Method Blank	95	111	102	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32017-1	B3KFL8	75	82	82	67	80	85
160-32017-1 MS	B3KFL8	79	81	81	79	81	85
160-32017-1 MSD	B3KFL8	86	83	84	80	87	91
160-32017-2 - DL	B3KFN0	68	87	93	75	89	100 X

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32017-3	B3KFM9	73	76
160-32017-3 MS	B3KFM9	83	86
160-32017-3 MSD	B3KFM9	98	87
160-32017-4	B3KFR3	78	81
160-32017-5	B3KFN2	84	80
160-32017-6	B3KFK8	74	79
160-32017-7	B3KFR0	79	80
160-32017-8	B3KFJ0	84	83
160-32017-9	B3KFH4	76	75
160-32017-10	B3KFF8	75	75
160-32017-11	B3KFH1	86	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.7	U	49.7	42.1		ug/Kg	☼	85	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	2.8	U	49.7	47.0		ug/Kg	☼	95	73 - 125	6	20
Acetone	7.2	U	49.7	54.0		ug/Kg	☼	109	54 - 139	11	20
Benzene	0.29	U	49.7	50.5		ug/Kg	☼	102	80 - 120	7	20
Bromodichloromethane	0.55	U	49.7	51.1		ug/Kg	☼	103	80 - 120	7	20
Bromoform	2.2	U	49.7	50.0		ug/Kg	☼	101	80 - 125	8	20
Bromomethane	2.6	U	49.7	50.0		ug/Kg	☼	101	70 - 126	12	20
Carbon disulfide	0.77	U	49.7	51.2		ug/Kg	☼	103	79 - 121	6	20
Carbon tetrachloride	0.57	U	49.7	49.7		ug/Kg	☼	100	80 - 120	8	20
Chlorobenzene	0.90	U	49.7	50.1		ug/Kg	☼	101	80 - 120	6	20
Chloroethane	2.2	U	49.7	46.2		ug/Kg	☼	93	64 - 133	7	20
Chloroform	0.42	U	49.7	49.2		ug/Kg	☼	99	80 - 120	8	20
Chloromethane	0.72	U o	49.7	54.6		ug/Kg	☼	110	75 - 120	8	20
cis-1,3-Dichloropropene	2.3	U	49.7	56.7		ug/Kg	☼	114	80 - 120	4	20
Dibromochloromethane	1.4	U	49.7	51.4		ug/Kg	☼	103	80 - 120	9	20
Ethylbenzene	0.77	U	49.7	50.8		ug/Kg	☼	102	80 - 120	8	20
Methylene Chloride	1.8	U	49.7	52.1		ug/Kg	☼	105	77 - 123	7	20
Styrene	2.2	U	49.7	55.0		ug/Kg	☼	111	80 - 120	6	20
Tetrachloroethene	0.62	U	49.7	49.2		ug/Kg	☼	99	80 - 120	7	20
Toluene	2.8	U	49.7	55.1		ug/Kg	☼	111	80 - 124	7	20
trans-1,3-Dichloropropene	1.9	U	49.7	53.9		ug/Kg	☼	108	80 - 122	9	20
Trichloroethene	0.43	U	49.7	54.8		ug/Kg	☼	110	79 - 120	7	20
Vinyl chloride	0.48	U	49.7	52.6		ug/Kg	☼	106	71 - 120	5	20
Xylenes, Total	0.94	U	99.5	110		ug/Kg	☼	110	80 - 120	6	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404156/1-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404156

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/05/18 09:35	12/07/18 13:16	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404156/1-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404156

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Methylphenol	42	U	330	42	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
2-Picoline	45	U	660	45	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Acenaphthene	35	U	330	35	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Acenaphthylene	46	U	330	46	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Acetophenone	34	U	330	34	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Aniline	60	U	330	60	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Anthracene	49	U	330	49	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Aramite	330	U	660	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404156/1-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404156

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Carbazole	47	U	330	47	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Chrysene	46	U	330	46	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Diallate	67	U	660	67	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Dibenzofuran	41	U	330	41	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Diethylphthalate	82	U	330	82	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Dimethoate	100	U	660	100	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Dinoseb	330	U	660	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Disulfoton	41	U	1600	41	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Famphur	33	U	3300	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Fluoranthene	50	U	330	50	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Fluorene	46	U	330	46	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachloroethane	35	U	330	35	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Isodrin	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Isophorone	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Isosafrole	67	U	660	67	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Kepone	330	U	3300	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Methapyrilene	140	U	1600	140	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Methyl parathion	120	U	1600	120	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Naphthalene	35	U	330	35	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Nitrobenzene	40	U	330	40	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404156/1-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404156

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Parathion	98	U	1600	98	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Phenacetin	54	U	660	54	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Phenanthrene	42	U	330	42	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Phenol	38	U	330	38	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Phorate	37	U	1600	37	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pronamide	53	U	660	53	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pyrene	73	U	330	73	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Pyridine	71	U	660	71	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Safrole	33	U	660	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/05/18 09:35	12/07/18 13:16	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/05/18 09:35	12/07/18 13:16	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*515*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
Unknown	*12400*	*N*	*ug/Kg*		*4.60*		*12/05/18 09:35*	*12/07/18 13:16*	*1*
Unknown	*513*	*N*	*ug/Kg*		*5.15*		*12/05/18 09:35*	*12/07/18 13:16*	*1*
n-Hexadecanoic acid	*351*	*N J*	*ug/Kg*		*10.98*	*57-10-3*	*12/05/18 09:35*	*12/07/18 13:16*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*74*		*47 - 125*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
2-Fluorophenol (Surr)	*80*		*54 - 102*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
Nitrobenzene-d5 (Surr)	*64*		*44 - 120*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
Phenol-d5 (Surr)	*75*		*51 - 104*	*12/05/18 09:35*	*12/07/18 13:16*	*1*
Terphenyl-d14 (Surr)	*89*		*59 - 98*	*12/05/18 09:35*	*12/07/18 13:16*	*1*

Lab Sample ID: LCS 160-404156/2-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2460		ug/Kg		74	58 - 101
1,2-Dichlorobenzene	3330	2470		ug/Kg		74	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2450		ug/Kg		73	56 - 98
2,4,5-Trichlorophenol	3330	2680		ug/Kg		80	56 - 109
2,4,6-Trichlorophenol	3330	2760		ug/Kg		83	56 - 110
2,4-Dichlorophenol	3330	2840		ug/Kg		85	57 - 99
2,4-Dimethylphenol	3330	2560		ug/Kg		77	53 - 97

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404156/2-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dinitrophenol	3330	2760		ug/Kg		83	10 - 89
2,4-Dinitrotoluene	3330	2780		ug/Kg		83	54 - 105
2,6-Dinitrotoluene	3330	2730		ug/Kg		82	55 - 105
2-Chloronaphthalene	3330	2740		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2710		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2620		ug/Kg		79	58 - 98
2-Methylphenol	3330	2730		ug/Kg		82	53 - 97
2-Nitroaniline	3330	2540		ug/Kg		76	55 - 108
2-Nitrophenol	3330	2580		ug/Kg		78	59 - 104
3 & 4 Methylphenol	3330	3080		ug/Kg		92	58 - 108
3,3'-Dichlorobenzidine	3330	2150		ug/Kg		65	42 - 104
3-Nitroaniline	3330	2450		ug/Kg		74	43 - 96
4,6-Dinitro-2-methylphenol	3330	3040		ug/Kg		91	19 - 102
4-Bromophenyl phenyl ether	3330	2720		ug/Kg		82	58 - 109
4-Chloro-3-methylphenol	3330	2700		ug/Kg		81	54 - 98
4-Chloroaniline	3330	1930		ug/Kg		58	41 - 83
4-Chlorophenyl phenyl ether	3330	2790		ug/Kg		84	55 - 105
4-Nitroaniline	3330	2780		ug/Kg		83	49 - 99
4-Nitrophenol	3330	2690		ug/Kg		81	48 - 106
Acenaphthene	3330	2780		ug/Kg		83	55 - 106
Acenaphthylene	3330	2730		ug/Kg		82	56 - 109
Anthracene	3330	2870		ug/Kg		86	56 - 103
Benzo[a]anthracene	3330	2820		ug/Kg		84	56 - 107
Benzo[a]pyrene	3330	2780		ug/Kg		83	57 - 109
Benzo[b]fluoranthene	3330	2790		ug/Kg		84	68 - 109
Benzo[g,h,i]perylene	3330	1920		ug/Kg		58	51 - 126
Benzo[k]fluoranthene	3330	2680		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2300		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2490		ug/Kg		75	56 - 99
Bis(2-chloroethyl)ether	3330	2190		ug/Kg		66	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2940		ug/Kg		88	59 - 113
Butyl benzyl phthalate	3330	2810		ug/Kg		84	60 - 112
Carbazole	3330	2920		ug/Kg		87	53 - 98
Chrysene	3330	2800		ug/Kg		84	54 - 107
Dibenz(a,h)anthracene	3330	2360		ug/Kg		71	52 - 126
Dibenzofuran	3330	2780		ug/Kg		83	55 - 103
Diethylphthalate	3330	2920		ug/Kg		88	54 - 101
Di-n-butyl phthalate	3330	2890		ug/Kg		87	57 - 102
Di-n-octyl phthalate	3330	3080		ug/Kg		92	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3310		ug/Kg		99	63 - 121
Fluoranthene	3330	2880		ug/Kg		86	54 - 100
Fluorene	3330	2900		ug/Kg		87	57 - 106
Hexachlorobenzene	3330	2770		ug/Kg		83	57 - 109
Hexachlorobutadiene	3330	2600		ug/Kg		78	59 - 106
Hexachlorocyclopentadiene	3330	2500		ug/Kg		75	44 - 140
Hexachloroethane	3330	2310		ug/Kg		69	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2380		ug/Kg		71	52 - 132

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404156/2-A
Matrix: Solid
Analysis Batch: 404534

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Isophorone	3330	2260		ug/Kg		68	55 - 96
Naphthalene	3330	2580		ug/Kg		77	57 - 98
Nitrobenzene	3330	2440		ug/Kg		73	58 - 102
N-Nitrosodi-n-propylamine	3330	2470		ug/Kg		74	54 - 98
Pentachlorophenol	3330	2680		ug/Kg		80	35 - 107
Phenanthrene	3330	2860		ug/Kg		86	57 - 103
Phenol	3330	2450		ug/Kg		74	50 - 96
Pyrene	3330	2790		ug/Kg		84	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*85*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*77*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

Lab Sample ID: 160-32070-1 MS
Matrix: Soil
Analysis Batch: 404534

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3630	2430		ug/Kg	☼	67	52 - 103
1,2-Dichlorobenzene	38	U	3630	2390		ug/Kg	☼	66	50 - 98
1,3-Dichlorobenzene	40	U	3630	2290		ug/Kg	☼	63	49 - 96
1,4-Dichlorobenzene	41	U	3630	2450		ug/Kg	☼	68	50 - 96
2,4,5-Trichlorophenol	57	U	3630	2860		ug/Kg	☼	79	41 - 116
2,4,6-Trichlorophenol	50	U	3630	2920		ug/Kg	☼	80	40 - 115
2,4-Dichlorophenol	43	U	3630	2880		ug/Kg	☼	79	47 - 104
2,4-Dimethylphenol	60	U	3630	2750		ug/Kg	☼	76	45 - 105
2,4-Dinitrophenol	360	U	3630	2820		ug/Kg	☼	78	10 - 100
2,4-Dinitrotoluene	140	U	3630	2930		ug/Kg	☼	81	42 - 113
2,6-Dinitrotoluene	68	U	3630	2930		ug/Kg	☼	81	46 - 109
2-Chloronaphthalene	41	U	3630	2710		ug/Kg	☼	75	52 - 108
2-Chlorophenol	42	U	3630	2690		ug/Kg	☼	74	48 - 102
2-Methylnaphthalene	44	U	3630	2660		ug/Kg	☼	73	55 - 97
2-Methylphenol	46	U	3630	2690		ug/Kg	☼	74	46 - 98
2-Nitroaniline	130	U	3630	2810		ug/Kg	☼	77	45 - 111
2-Nitrophenol	160	U	3630	2640		ug/Kg	☼	73	38 - 115
3 & 4 Methylphenol	72	U	3630	3120		ug/Kg	☼	86	48 - 111
3,3'-Dichlorobenzidine	120	U	3630	2290		ug/Kg	☼	63	23 - 102
3-Nitroaniline	110	U	3630	2690		ug/Kg	☼	74	32 - 95
4,6-Dinitro-2-methylphenol	360	U	3630	3080		ug/Kg	☼	85	15 - 118
4-Bromophenyl phenyl ether	53	U	3630	2900		ug/Kg	☼	80	53 - 110
4-Chloro-3-methylphenol	46	U	3630	2940		ug/Kg	☼	81	36 - 111
4-Chloroaniline	51	U	3630	2130		ug/Kg	☼	59	32 - 79
4-Chlorophenyl phenyl ether	47	U	3630	2880		ug/Kg	☼	79	51 - 103
4-Nitroaniline	81	U	3630	3010		ug/Kg	☼	83	36 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32070-1 MS
Matrix: Soil
Analysis Batch: 404534

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitrophenol	360	U	3630	2870		ug/Kg	☼	79	40 - 113
Acenaphthene	38	U	3630	2790		ug/Kg	☼	77	53 - 105
Acenaphthylene	50	U	3630	2750		ug/Kg	☼	76	55 - 107
Anthracene	53	U	3630	2950		ug/Kg	☼	81	55 - 103
Benzo[a]anthracene	65	U	3630	2970		ug/Kg	☼	82	48 - 112
Benzo[a]pyrene	97	U	3630	2890		ug/Kg	☼	80	46 - 117
Benzo[b]fluoranthene	36	U	3630	2950		ug/Kg	☼	81	45 - 125
Benzo[g,h,i]perylene	36	U	3630	1900		ug/Kg	☼	52	24 - 134
Benzo[k]fluoranthene	87	U	3630	2830		ug/Kg	☼	78	43 - 114
bis(2 chloro-1-methylethyl) ether	46	U	3630	2350		ug/Kg	☼	65	38 - 98
Bis(2-chloroethoxy)methane	41	U	3630	2520		ug/Kg	☼	69	49 - 100
Bis(2-chloroethyl)ether	36	U	3630	2260		ug/Kg	☼	62	49 - 100
Bis(2-ethylhexyl) phthalate	93	U	3630	3120		ug/Kg	☼	86	50 - 113
Butyl benzyl phthalate	100	U	3630	3060		ug/Kg	☼	84	54 - 112
Carbazole	51	U	3630	3080		ug/Kg	☼	85	47 - 102
Chrysene	50	U	3630	2960		ug/Kg	☼	81	45 - 115
Dibenz(a,h)anthracene	72	U	3630	2220		ug/Kg	☼	61	30 - 134
Dibenzofuran	44	U	3630	2800		ug/Kg	☼	77	50 - 102
Diethylphthalate	89	U	3630	3080		ug/Kg	☼	85	46 - 107
Di-n-butyl phthalate	70	U	3630	3100		ug/Kg	☼	85	49 - 107
Di-n-octyl phthalate	140	U	3630	3400		ug/Kg	☼	93	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3630	3510		ug/Kg	☼	97	33 - 140
Fluoranthene	55	U	3630	3000		ug/Kg	☼	83	45 - 109
Fluorene	50	U	3630	2920		ug/Kg	☼	80	45 - 109
Hexachlorobenzene	46	U	3630	2860		ug/Kg	☼	79	48 - 113
Hexachlorobutadiene	44	U	3630	2520		ug/Kg	☼	69	48 - 109
Hexachlorocyclopentadiene	360	U	3630	2350		ug/Kg	☼	65	21 - 144
Hexachloroethane	38	U	3630	2280		ug/Kg	☼	63	44 - 102
Indeno[1,2,3-cd]pyrene	69	U	3630	2190		ug/Kg	☼	60	30 - 136
Isophorone	41	U	3630	2280		ug/Kg	☼	63	48 - 100
Naphthalene	39	U	3630	2550		ug/Kg	☼	70	54 - 98
Nitrobenzene	44	U	3630	2550		ug/Kg	☼	70	51 - 106
N-Nitrosodi-n-propylamine	44	U	3630	2550		ug/Kg	☼	70	47 - 104
Pentachlorophenol	360	U	3630	2700		ug/Kg	☼	74	23 - 116
Phenanthrene	46	U	3630	2980		ug/Kg	☼	82	53 - 106
Phenol	41	U	3630	2560		ug/Kg	☼	70	41 - 100
Pyrene	79	U	3630	2890		ug/Kg	☼	80	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*78*		*47 - 125*
2-Fluorobiphenyl (Surr)	*76*		*59 - 110*
2-Fluorophenol (Surr)	*75*		*54 - 102*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*
Phenol-d5 (Surr)	*70*		*51 - 104*
Terphenyl-d14 (Surr)	*82*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 404534

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3630	2290		ug/Kg	☼	63	52 - 103	6	30
1,2-Dichlorobenzene	38	U	3630	2270		ug/Kg	☼	62	50 - 98	5	30
1,3-Dichlorobenzene	40	U	3630	2220		ug/Kg	☼	61	49 - 96	3	30
1,4-Dichlorobenzene	41	U	3630	2300		ug/Kg	☼	63	50 - 96	7	30
2,4,5-Trichlorophenol	57	U	3630	2560		ug/Kg	☼	71	41 - 116	11	30
2,4,6-Trichlorophenol	50	U	3630	2600		ug/Kg	☼	72	40 - 115	12	30
2,4-Dichlorophenol	43	U	3630	2730		ug/Kg	☼	75	47 - 104	5	30
2,4-Dimethylphenol	60	U	3630	2750		ug/Kg	☼	76	45 - 105	0	30
2,4-Dinitrophenol	360	U	3630	2300		ug/Kg	☼	63	10 - 100	20	30
2,4-Dinitrotoluene	140	U	3630	2590		ug/Kg	☼	71	42 - 113	12	30
2,6-Dinitrotoluene	68	U	3630	2540		ug/Kg	☼	70	46 - 109	14	30
2-Chloronaphthalene	41	U	3630	2510		ug/Kg	☼	69	52 - 108	8	30
2-Chlorophenol	42	U	3630	2510		ug/Kg	☼	69	48 - 102	7	30
2-Methylnaphthalene	44	U	3630	2520		ug/Kg	☼	69	55 - 97	6	30
2-Methylphenol	46	U	3630	2580		ug/Kg	☼	71	46 - 98	4	30
2-Nitroaniline	130	U	3630	2600		ug/Kg	☼	72	45 - 111	8	30
2-Nitrophenol	160	U	3630	2540		ug/Kg	☼	70	38 - 115	4	30
3 & 4 Methylphenol	72	U	3630	2960		ug/Kg	☼	82	48 - 111	5	30
3,3'-Dichlorobenzidine	120	U	3630	2150		ug/Kg	☼	59	23 - 102	7	30
3-Nitroaniline	110	U	3630	2580		ug/Kg	☼	71	32 - 95	4	30
4,6-Dinitro-2-methylphenol	360	U	3630	2770		ug/Kg	☼	76	15 - 118	10	30
4-Bromophenyl phenyl ether	53	U	3630	2640		ug/Kg	☼	73	53 - 110	10	30
4-Chloro-3-methylphenol	46	U	3630	2750		ug/Kg	☼	76	36 - 111	7	30
4-Chloroaniline	51	U	3630	2080		ug/Kg	☼	57	32 - 79	2	30
4-Chlorophenyl phenyl ether	47	U	3630	2530		ug/Kg	☼	70	51 - 103	13	30
4-Nitroaniline	81	U	3630	2670		ug/Kg	☼	74	36 - 102	12	30
4-Nitrophenol	360	U	3630	2630		ug/Kg	☼	72	40 - 113	9	30
Acenaphthene	38	U	3630	2570		ug/Kg	☼	71	53 - 105	8	30
Acenaphthylene	50	U	3630	2550		ug/Kg	☼	70	55 - 107	7	30
Anthracene	53	U	3630	2810		ug/Kg	☼	77	55 - 103	5	30
Benzo[a]anthracene	65	U	3630	2680		ug/Kg	☼	74	48 - 112	10	30
Benzo[a]pyrene	97	U	3630	2650		ug/Kg	☼	73	46 - 117	9	30
Benzo[b]fluoranthene	36	U	3630	2660		ug/Kg	☼	73	45 - 125	11	30
Benzo[g,h,i]perylene	36	U	3630	1810		ug/Kg	☼	50	24 - 134	5	30
Benzo[k]fluoranthene	87	U	3630	2590		ug/Kg	☼	71	43 - 114	9	30
bis(2 chloro-1-methylethyl) ether	46	U	3630	2280		ug/Kg	☼	63	38 - 98	3	30
Bis(2-chloroethoxy)methane	41	U	3630	2440		ug/Kg	☼	67	49 - 100	3	30
Bis(2-chloroethyl)ether	36	U	3630	2130		ug/Kg	☼	59	49 - 100	6	30
Bis(2-ethylhexyl) phthalate	93	U	3630	2980		ug/Kg	☼	82	50 - 113	5	30
Butyl benzyl phthalate	100	U	3630	2860		ug/Kg	☼	79	54 - 112	7	30
Carbazole	51	U	3630	2840		ug/Kg	☼	78	47 - 102	8	30
Chrysene	50	U	3630	2680		ug/Kg	☼	74	45 - 115	10	30
Dibenz(a,h)anthracene	72	U	3630	2140		ug/Kg	☼	59	30 - 134	4	30
Dibenzofuran	44	U	3630	2570		ug/Kg	☼	71	50 - 102	9	30
Diethylphthalate	89	U	3630	2680		ug/Kg	☼	74	46 - 107	14	30
Di-n-butyl phthalate	70	U	3630	2960		ug/Kg	☼	81	49 - 107	5	30
Di-n-octyl phthalate	140	U	3630	3110		ug/Kg	☼	86	35 - 125	9	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 404534

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3630	3290		ug/Kg	☼	91	33 - 140	6	30
Fluoranthene	55	U	3630	2810		ug/Kg	☼	77	45 - 109	6	30
Fluorene	50	U	3630	2670		ug/Kg	☼	74	45 - 109	9	30
Hexachlorobenzene	46	U	3630	2590		ug/Kg	☼	71	48 - 113	10	30
Hexachlorobutadiene	44	U	3630	2420		ug/Kg	☼	67	48 - 109	4	30
Hexachlorocyclopentadiene	360	U	3630	2210		ug/Kg	☼	61	21 - 144	6	30
Hexachloroethane	38	U	3630	2270		ug/Kg	☼	63	44 - 102	0	30
Indeno[1,2,3-cd]pyrene	69	U	3630	2170		ug/Kg	☼	60	30 - 136	1	30
Isophorone	41	U	3630	2240		ug/Kg	☼	62	48 - 100	1	30
Naphthalene	39	U	3630	2490		ug/Kg	☼	69	54 - 98	2	30
Nitrobenzene	44	U	3630	2470		ug/Kg	☼	68	51 - 106	3	30
N-Nitrosodi-n-propylamine	44	U	3630	2450		ug/Kg	☼	68	47 - 104	4	30
Pentachlorophenol	360	U	3630	2470		ug/Kg	☼	68	23 - 116	9	30
Phenanthrene	46	U	3630	2790		ug/Kg	☼	77	53 - 106	6	30
Phenol	41	U	3630	2420		ug/Kg	☼	67	41 - 100	5	30
Pyrene	79	U	3630	2710		ug/Kg	☼	75	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*68*		*47 - 125*
2-Fluorobiphenyl (Surr)	*71*		*59 - 110*
2-Fluorophenol (Surr)	*72*		*54 - 102*
Nitrobenzene-d5 (Surr)	*66*		*44 - 120*
Phenol-d5 (Surr)	*68*		*51 - 104*
Terphenyl-d14 (Surr)	*77*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403934/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403934

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32070-1
SDG: SL32070-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32070-1	B3KFF6	104	107	101	105
160-32070-1 MS	B3KFF6	100	105	99	104
160-32070-1 MSD	B3KFF6	95	101	98	103
160-32070-2	B3KFK6	101	102	102	104
160-32070-3	B3KFK3	105	106	100	104
160-32070-4	B3KFP5	105	105	101	104
160-32070-5	B3KFM4	105	105	100	102
160-32070-6	B3KFL5	105	105	105	103
160-32070-7	B3KFP8	107	102	108	102
160-32070-8	B3KFM7	108	110	104	103
160-32070-9	B3L196	114	104	106	103
160-32070-10	B3KFJ7	115	109	106	106
160-32070-11	B3KFP2	113	107	104	103
160-32070-12	B3KFK0	111	107	105	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405438/5	Lab Control Sample	98	101	100	103
LCSD 160-405438/6	Lab Control Sample Dup	96	101	101	104
MB 160-405438/8	Method Blank	99	101	102	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32070-1	B3KFF6	72	74	73	57	66	76
160-32070-1 MS	B3KFF6	78	76	75	67	70	82
160-32070-1 MSD	B3KFF6	68	71	72	66	68	77
160-32070-2	B3KFK6	80	81	80	64	75	85
160-32070-3	B3KFK3	75	80	84	66	80	83
160-32070-4	B3KFP5	75	78	81	63	78	81
160-32070-5	B3KFM4	82	84	83	68	77	87

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32070-1
SDG: SL32070-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
160-32070-6	B3KFL5	75	74	75	61	70	81
160-32070-7	B3KFP8	79	77	76	60	72	83
160-32070-8 - DL	B3KFM7	76	83	73	64	72	90
160-32070-9	B3L196	75	77	75	59	73	84
160-32070-10	B3KFJ7	54	58 X	61	47	57	66
160-32070-11	B3KFP2	78	79	81	63	76	85
160-32070-12	B3KFK0	74	81	85	67	79	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
LCS 160-404156/2-A	Lab Control Sample	85	82	79	74	77	85
MB 160-404156/1-A	Method Blank	74	81	80	64	75	89

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32070-13	B3KFP1	92	90
160-32070-13 MS	B3KFP1	86	87
160-32070-13 MSD	B3KFP1	95	86
160-32070-14	B3KFL4	85	91
160-32070-15	B3KFM0	91	80
160-32070-16	B3KFM6	98	84
160-32070-17	B3KFK5	70 X	78
160-32070-18	B3KFP4	82	82
160-32070-19	B3KFF2	82	81
160-32070-20	B3KFN8	85	86

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 405438

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 405446

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.8	U	52.7	45.4		ug/Kg	☼	86	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	2.9	U	52.7	50.4		ug/Kg	☼	96	73 - 125	2	20
Acetone	7.3	U	52.7	56.0		ug/Kg	☼	106	54 - 139	4	20
Benzene	0.29	U	52.7	54.0		ug/Kg	☼	103	80 - 120	2	20
Bromodichloromethane	0.56	U	52.7	54.5		ug/Kg	☼	104	80 - 120	3	20
Bromoform	2.2	U	52.7	56.3		ug/Kg	☼	107	80 - 125	2	20
Bromomethane	2.7	U	52.7	57.7		ug/Kg	☼	110	70 - 126	2	20
Carbon disulfide	0.78	U	52.7	54.8		ug/Kg	☼	104	79 - 121	3	20
Carbon tetrachloride	0.58	U	52.7	53.0		ug/Kg	☼	101	80 - 120	5	20
Chlorobenzene	0.92	U	52.7	53.2		ug/Kg	☼	101	80 - 120	4	20
Chloroethane	2.2	U	52.7	54.4		ug/Kg	☼	103	64 - 133	5	20
Chloroform	0.43	U	52.7	52.1		ug/Kg	☼	99	80 - 120	2	20
Chloromethane	0.74	U o	52.7	61.2		ug/Kg	☼	116	75 - 120	0	20
cis-1,3-Dichloropropene	2.4	U	52.7	59.2		ug/Kg	☼	112	80 - 120	4	20
Dibromochloromethane	1.4	U	52.7	55.6		ug/Kg	☼	106	80 - 120	1	20
Ethylbenzene	0.78	U	52.7	53.5		ug/Kg	☼	102	80 - 120	4	20
Methylene Chloride	1.8	U	52.7	56.9		ug/Kg	☼	108	77 - 123	1	20
Styrene	2.2	U	52.7	57.8		ug/Kg	☼	110	80 - 120	3	20
Tetrachloroethene	0.64	U	52.7	53.1		ug/Kg	☼	101	80 - 120	4	20
Toluene	2.8	U	52.7	58.4		ug/Kg	☼	111	80 - 124	3	20
trans-1,3-Dichloropropene	2.0	U	52.7	56.6		ug/Kg	☼	107	80 - 122	2	20
Trichloroethene	0.44	U	52.7	59.4		ug/Kg	☼	113	79 - 120	3	20
Vinyl chloride	0.49	U	52.7	57.0		ug/Kg	☼	108	71 - 120	2	20
Xylenes, Total	0.96	U	105	116		ug/Kg	☼	110	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Methylphenol	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Picoline	45	U	660	45	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acenaphthene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acenaphthylene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acetophenone	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Aniline	60	U	330	60	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Anthracene	49	U	330	49	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Aramite	330	U	660	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Carbazole	47	U	330	47	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Chrysene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diallate	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dibenzofuran	41	U	330	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diethylphthalate	82	U	330	82	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dimethoate	100	U	660	100	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dinoseb	330	U	660	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Disulfoton	41	U	1600	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Famphur	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Fluoranthene	50	U	330	50	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Fluorene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachloroethane	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isodrin	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isophorone	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isosafrole	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Kepone	330	U	3300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methapyrilene	140	U	1600	140	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methyl parathion	120	U	1600	120	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Naphthalene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Nitrobenzene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Parathion	98	U	1600	98	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenacetin	54	U	660	54	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenanthrene	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenol	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phorate	37	U	1600	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pronamide	53	U	660	53	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pyrene	73	U	330	73	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pyridine	71	U	660	71	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Safrole	33	U	660	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*498*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Unknown	*11500*	*N*	*ug/Kg*		*4.61*		*12/04/18 15:56*	*12/10/18 11:13*	*1*
Unknown	*506*	*N*	*ug/Kg*		*5.15*		*12/04/18 15:56*	*12/10/18 11:13*	*1*
n-Hexadecanoic acid	*319*	*N J*	*ug/Kg*		*10.99*	*57-10-3*	*12/04/18 15:56*	*12/10/18 11:13*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*67*		*47 - 125*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
2-Fluorobiphenyl (Surr)	*74*		*59 - 110*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
2-Fluorophenol (Surr)	*75*		*54 - 102*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Nitrobenzene-d5 (Surr)	*63*		*44 - 120*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Phenol-d5 (Surr)	*69*		*51 - 104*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Terphenyl-d14 (Surr)	*77*		*59 - 98*	*12/04/18 15:56*	*12/10/18 11:13*	*1*

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2310		ug/Kg		69	58 - 101
1,2-Dichlorobenzene	3330	2250		ug/Kg		68	57 - 99
1,3-Dichlorobenzene	3330	2170		ug/Kg		65	55 - 98
1,4-Dichlorobenzene	3330	2270		ug/Kg		68	56 - 98
2,4,5-Trichlorophenol	3330	2420		ug/Kg		73	56 - 109
2,4,6-Trichlorophenol	3330	2520		ug/Kg		76	56 - 110
2,4-Dichlorophenol	3330	2610		ug/Kg		78	57 - 99
2,4-Dimethylphenol	3330	2580		ug/Kg		77	53 - 97

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dinitrophenol	3330	2270		ug/Kg		68	10 - 89
2,4-Dinitrotoluene	3330	2680		ug/Kg		80	54 - 105
2,6-Dinitrotoluene	3330	2550		ug/Kg		77	55 - 105
2-Chloronaphthalene	3330	2510		ug/Kg		75	56 - 111
2-Chlorophenol	3330	2550		ug/Kg		77	56 - 99
2-Methylnaphthalene	3330	2590		ug/Kg		78	58 - 98
2-Methylphenol	3330	2550		ug/Kg		77	53 - 97
2-Nitroaniline	3330	2550		ug/Kg		77	55 - 108
2-Nitrophenol	3330	2480		ug/Kg		74	59 - 104
3 & 4 Methylphenol	3330	2920		ug/Kg		87	58 - 108
3,3'-Dichlorobenzidine	3330	2130		ug/Kg		64	42 - 104
3-Nitroaniline	3330	2400		ug/Kg		72	43 - 96
4,6-Dinitro-2-methylphenol	3330	2710		ug/Kg		81	19 - 102
4-Bromophenyl phenyl ether	3330	2510		ug/Kg		75	58 - 109
4-Chloro-3-methylphenol	3330	2660		ug/Kg		80	54 - 98
4-Chloroaniline	3330	1980		ug/Kg		60	41 - 83
4-Chlorophenyl phenyl ether	3330	2540		ug/Kg		76	55 - 105
4-Nitroaniline	3330	2750		ug/Kg		82	49 - 99
4-Nitrophenol	3330	2620		ug/Kg		79	48 - 106
Acenaphthene	3330	2600		ug/Kg		78	55 - 106
Acenaphthylene	3330	2540		ug/Kg		76	56 - 109
Anthracene	3330	2600		ug/Kg		78	56 - 103
Benzo[a]anthracene	3330	2620		ug/Kg		79	56 - 107
Benzo[a]pyrene	3330	2550		ug/Kg		76	57 - 109
Benzo[b]fluoranthene	3330	2580		ug/Kg		78	68 - 109
Benzo[g,h,i]perylene	3330	1740		ug/Kg		52	51 - 126
Benzo[k]fluoranthene	3330	2430		ug/Kg		73	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2290		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2420		ug/Kg		73	56 - 99
Bis(2-chloroethyl)ether	3330	2080		ug/Kg		62	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2860		ug/Kg		86	59 - 113
Butyl benzyl phthalate	3330	2730		ug/Kg		82	60 - 112
Carbazole	3330	2710		ug/Kg		81	53 - 98
Chrysene	3330	2640		ug/Kg		79	54 - 107
Dibenz(a,h)anthracene	3330	2060		ug/Kg		62	52 - 126
Dibenzofuran	3330	2550		ug/Kg		76	55 - 103
Diethylphthalate	3330	2680		ug/Kg		80	54 - 101
Di-n-butyl phthalate	3330	2740		ug/Kg		82	57 - 102
Di-n-octyl phthalate	3330	2980		ug/Kg		90	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3070		ug/Kg		92	63 - 121
Fluoranthene	3330	2680		ug/Kg		80	54 - 100
Fluorene	3330	2640		ug/Kg		79	57 - 106
Hexachlorobenzene	3330	2520		ug/Kg		76	57 - 109
Hexachlorobutadiene	3330	2440		ug/Kg		73	59 - 106
Hexachlorocyclopentadiene	3330	2160		ug/Kg		65	44 - 140
Hexachloroethane	3330	2250		ug/Kg		68	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2360		ug/Kg		71	52 - 132

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Isophorone	3330	2220		ug/Kg		67	55 - 96
Naphthalene	3330	2470		ug/Kg		74	57 - 98
Nitrobenzene	3330	2430		ug/Kg		73	58 - 102
N-Nitrosodi-n-propylamine	3330	2450		ug/Kg		74	54 - 98
Pentachlorophenol	3330	2370		ug/Kg		71	35 - 107
Phenanthrene	3330	2640		ug/Kg		79	57 - 103
Phenol	3330	2410		ug/Kg		72	50 - 96
Pyrene	3330	2640		ug/Kg		79	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*75*		*59 - 110*
2-Fluorophenol (Surr)	*75*		*54 - 102*
Nitrobenzene-d5 (Surr)	*73*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*80*		*59 - 98*

Lab Sample ID: 160-32072-8 MS
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3580	2580		ug/Kg	☼	72	52 - 103
1,2-Dichlorobenzene	37	U	3580	2480		ug/Kg	☼	69	50 - 98
1,3-Dichlorobenzene	39	U	3580	2340		ug/Kg	☼	65	49 - 96
1,4-Dichlorobenzene	40	U	3580	2450		ug/Kg	☼	68	50 - 96
2,4,5-Trichlorophenol	56	U	3580	2790		ug/Kg	☼	78	41 - 116
2,4,6-Trichlorophenol	49	U	3580	3010		ug/Kg	☼	84	40 - 115
2,4-Dichlorophenol	42	U	3580	2980		ug/Kg	☼	83	47 - 104
2,4-Dimethylphenol	59	U	3580	2900		ug/Kg	☼	81	45 - 105
2,4-Dinitrophenol	350	U	3580	2580		ug/Kg	☼	72	10 - 100
2,4-Dinitrotoluene	130	U	3580	3000		ug/Kg	☼	84	42 - 113
2,6-Dinitrotoluene	67	U	3580	3030		ug/Kg	☼	84	46 - 109
2-Chloronaphthalene	40	U	3580	2880		ug/Kg	☼	80	52 - 108
2-Chlorophenol	41	U	3580	2960		ug/Kg	☼	83	48 - 102
2-Methylnaphthalene	43	U	3580	2880		ug/Kg	☼	80	55 - 97
2-Methylphenol	45	U	3580	2930		ug/Kg	☼	82	46 - 98
2-Nitroaniline	130	U	3580	2890		ug/Kg	☼	81	45 - 111
2-Nitrophenol	150	U	3580	2870		ug/Kg	☼	80	38 - 115
3 & 4 Methylphenol	71	U	3580	3360		ug/Kg	☼	94	48 - 111
3,3'-Dichlorobenzidine	120	U	3580	2330		ug/Kg	☼	65	23 - 102
3-Nitroaniline	110	U	3580	2660		ug/Kg	☼	74	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3580	2970		ug/Kg	☼	83	15 - 118
4-Bromophenyl phenyl ether	52	U	3580	2840		ug/Kg	☼	79	53 - 110
4-Chloro-3-methylphenol	45	U	3580	3010		ug/Kg	☼	84	36 - 111
4-Chloroaniline	49	U	3580	2180		ug/Kg	☼	61	32 - 79
4-Chlorophenyl phenyl ether	46	U	3580	2830		ug/Kg	☼	79	51 - 103
4-Nitroaniline	79	U	3580	3010		ug/Kg	☼	84	36 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32072-8 MS
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitrophenol	350	U	3580	2860		ug/Kg	☼	80	40 - 113
Acenaphthene	37	U	3580	2860		ug/Kg	☼	80	53 - 105
Acenaphthylene	49	U	3580	2890		ug/Kg	☼	81	55 - 107
Anthracene	52	U	3580	2950		ug/Kg	☼	82	55 - 103
Benzo[a]anthracene	63	U	3580	3030		ug/Kg	☼	84	48 - 112
Benzo[a]pyrene	95	U	3580	2990		ug/Kg	☼	83	46 - 117
Benzo[b]fluoranthene	36	U	3580	3110		ug/Kg	☼	87	45 - 125
Benzo[g,h,i]perylene	36	U T	3580	1840		ug/Kg	☼	51	24 - 134
Benzo[k]fluoranthene	85	U	3580	2980		ug/Kg	☼	83	43 - 114
bis(2 chloro-1-methylethyl) ether	45	U	3580	2560		ug/Kg	☼	71	38 - 98
Bis(2-chloroethoxy)methane	40	U	3580	2790		ug/Kg	☼	78	49 - 100
Bis(2-chloroethyl)ether	36	U	3580	2460		ug/Kg	☼	69	49 - 100
Bis(2-ethylhexyl) phthalate	91	U	3580	3270		ug/Kg	☼	91	50 - 113
Butyl benzyl phthalate	99	U	3580	3220		ug/Kg	☼	90	54 - 112
Carbazole	50	U	3580	3000		ug/Kg	☼	84	47 - 102
Chrysene	49	U	3580	3040		ug/Kg	☼	85	45 - 115
Dibenz(a,h)anthracene	70	U	3580	2350		ug/Kg	☼	66	30 - 134
Dibenzofuran	43	U	3580	2880		ug/Kg	☼	80	50 - 102
Diethylphthalate	87	U	3580	3090		ug/Kg	☼	86	46 - 107
Di-n-butyl phthalate	68	U	3580	3070		ug/Kg	☼	86	49 - 107
Di-n-octyl phthalate	140	U	3580	3450		ug/Kg	☼	96	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3480		ug/Kg	☼	97	33 - 140
Fluoranthene	54	U	3580	2970		ug/Kg	☼	83	45 - 109
Fluorene	49	U	3580	2990		ug/Kg	☼	84	45 - 109
Hexachlorobenzene	45	U	3580	2910		ug/Kg	☼	81	48 - 113
Hexachlorobutadiene	43	U	3580	2650		ug/Kg	☼	74	48 - 109
Hexachlorocyclopentadiene	350	U	3580	2370		ug/Kg	☼	66	21 - 144
Hexachloroethane	37	U	3580	2400		ug/Kg	☼	67	44 - 102
Indeno[1,2,3-cd]pyrene	67	U	3580	2260		ug/Kg	☼	63	30 - 136
Isophorone	40	U	3580	2460		ug/Kg	☼	69	48 - 100
Naphthalene	38	U	3580	2730		ug/Kg	☼	76	54 - 98
Nitrobenzene	43	U	3580	2740		ug/Kg	☼	76	51 - 106
N-Nitrosodi-n-propylamine	43	U	3580	2800		ug/Kg	☼	78	47 - 104
Pentachlorophenol	350	U	3580	2580		ug/Kg	☼	72	23 - 116
Phenanthrene	45	U	3580	2990		ug/Kg	☼	83	53 - 106
Phenol	40	U	3580	2790		ug/Kg	☼	78	41 - 100
Pyrene	78	U	3580	3090		ug/Kg	☼	86	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*87*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3600	2340		ug/Kg	☼	65	52 - 103	10	30
1,2-Dichlorobenzene	37	U	3600	2240		ug/Kg	☼	62	50 - 98	10	30
1,3-Dichlorobenzene	39	U	3600	2190		ug/Kg	☼	61	49 - 96	7	30
1,4-Dichlorobenzene	40	U	3600	2200		ug/Kg	☼	61	50 - 96	11	30
2,4,5-Trichlorophenol	56	U	3600	2970		ug/Kg	☼	83	41 - 116	6	30
2,4,6-Trichlorophenol	49	U	3600	3040		ug/Kg	☼	85	40 - 115	1	30
2,4-Dichlorophenol	42	U	3600	3120		ug/Kg	☼	87	47 - 104	4	30
2,4-Dimethylphenol	59	U	3600	3000		ug/Kg	☼	83	45 - 105	3	30
2,4-Dinitrophenol	350	U	3600	2060		ug/Kg	☼	57	10 - 100	22	30
2,4-Dinitrotoluene	130	U	3600	2970		ug/Kg	☼	83	42 - 113	1	30
2,6-Dinitrotoluene	67	U	3600	2960		ug/Kg	☼	82	46 - 109	2	30
2-Chloronaphthalene	40	U	3600	2880		ug/Kg	☼	80	52 - 108	0	30
2-Chlorophenol	41	U	3600	2690		ug/Kg	☼	75	48 - 102	9	30
2-Methylnaphthalene	43	U	3600	2750		ug/Kg	☼	76	55 - 97	5	30
2-Methylphenol	45	U	3600	2790		ug/Kg	☼	78	46 - 98	5	30
2-Nitroaniline	130	U	3600	2950		ug/Kg	☼	82	45 - 111	2	30
2-Nitrophenol	150	U	3600	2560		ug/Kg	☼	71	38 - 115	12	30
3 & 4 Methylphenol	71	U	3600	3280		ug/Kg	☼	91	48 - 111	3	30
3,3'-Dichlorobenzidine	120	U	3600	2190		ug/Kg	☼	61	23 - 102	6	30
3-Nitroaniline	110	U	3600	2650		ug/Kg	☼	74	32 - 95	0	30
4,6-Dinitro-2-methylphenol	350	U	3600	2500		ug/Kg	☼	69	15 - 118	17	30
4-Bromophenyl phenyl ether	52	U	3600	2940		ug/Kg	☼	82	53 - 110	3	30
4-Chloro-3-methylphenol	45	U	3600	3100		ug/Kg	☼	86	36 - 111	3	30
4-Chloroaniline	49	U	3600	1980		ug/Kg	☼	55	32 - 79	10	30
4-Chlorophenyl phenyl ether	46	U	3600	3020		ug/Kg	☼	84	51 - 103	7	30
4-Nitroaniline	79	U	3600	3150		ug/Kg	☼	88	36 - 102	5	30
4-Nitrophenol	350	U	3600	2950		ug/Kg	☼	82	40 - 113	3	30
Acenaphthene	37	U	3600	2930		ug/Kg	☼	81	53 - 105	2	30
Acenaphthylene	49	U	3600	2890		ug/Kg	☼	80	55 - 107	0	30
Anthracene	52	U	3600	3010		ug/Kg	☼	84	55 - 103	2	30
Benzo[a]anthracene	63	U	3600	3090		ug/Kg	☼	86	48 - 112	2	30
Benzo[a]pyrene	95	U	3600	3000		ug/Kg	☼	83	46 - 117	0	30
Benzo[b]fluoranthene	36	U	3600	3690		ug/Kg	☼	102	45 - 125	17	30
Benzo[g,h,i]perylene	36	U T	3600	6150	X T y	ug/Kg	☼	171	24 - 134	108	30
Benzo[k]fluoranthene	85	U	3600	3540		ug/Kg	☼	98	43 - 114	17	30
bis(2 chloro-1-methylethyl) ether	45	U	3600	2210		ug/Kg	☼	61	38 - 98	14	30
Bis(2-chloroethoxy)methane	40	U	3600	2430		ug/Kg	☼	67	49 - 100	14	30
Bis(2-chloroethyl)ether	36	U	3600	2130		ug/Kg	☼	59	49 - 100	14	30
Bis(2-ethylhexyl) phthalate	91	U	3600	3440		ug/Kg	☼	96	50 - 113	5	30
Butyl benzyl phthalate	99	U	3600	3260		ug/Kg	☼	91	54 - 112	1	30
Carbazole	50	U	3600	3140		ug/Kg	☼	87	47 - 102	4	30
Chrysene	49	U	3600	3070		ug/Kg	☼	85	45 - 115	1	30
Dibenz(a,h)anthracene	70	U	3600	4410	y	ug/Kg	☼	122	30 - 134	61	30
Dibenzofuran	43	U	3600	2970		ug/Kg	☼	83	50 - 102	3	30
Diethylphthalate	87	U	3600	3190		ug/Kg	☼	89	46 - 107	3	30
Di-n-butyl phthalate	68	U	3600	3210		ug/Kg	☼	89	49 - 107	5	30
Di-n-octyl phthalate	140	U	3600	3460		ug/Kg	☼	96	35 - 125	0	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3600	3530		ug/Kg	☼	98	33 - 140	1	30
Fluoranthene	54	U	3600	3010		ug/Kg	☼	84	45 - 109	1	30
Fluorene	49	U	3600	3120		ug/Kg	☼	87	45 - 109	4	30
Hexachlorobenzene	45	U	3600	2960		ug/Kg	☼	82	48 - 113	2	30
Hexachlorobutadiene	43	U	3600	2420		ug/Kg	☼	67	48 - 109	9	30
Hexachlorocyclopentadiene	350	U	3600	1860		ug/Kg	☼	52	21 - 144	24	30
Hexachloroethane	37	U	3600	2060		ug/Kg	☼	57	44 - 102	15	30
Indeno[1,2,3-cd]pyrene	67	U	3600	4780	y	ug/Kg	☼	133	30 - 136	72	30
Isophorone	40	U	3600	2240		ug/Kg	☼	62	48 - 100	10	30
Naphthalene	38	U	3600	2500		ug/Kg	☼	70	54 - 98	9	30
Nitrobenzene	43	U	3600	2410		ug/Kg	☼	67	51 - 106	12	30
N-Nitrosodi-n-propylamine	43	U	3600	2510		ug/Kg	☼	70	47 - 104	11	30
Pentachlorophenol	350	U	3600	2710		ug/Kg	☼	75	23 - 116	5	30
Phenanthrene	45	U	3600	3040		ug/Kg	☼	84	53 - 106	2	30
Phenol	40	U	3600	2620		ug/Kg	☼	73	41 - 100	6	30
Pyrene	78	U	3600	3110		ug/Kg	☼	86	39 - 130	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*85*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*73*		*54 - 102*
Nitrobenzene-d5 (Surr)	*65*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403934/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403934

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32072-1
SDG: SL32072-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32072-8	B3KFF3	102	101	101	102
160-32072-8 MS	B3KFF3	96	105	98	105
160-32072-8 MSD	B3KFF3	96	106	98	103
160-32072-9	B3KFM1	114	108	104	103
160-32072-10	B3KFN9	111	106	101	101
160-32072-11	B3L1B1	112	104	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405438/5	Lab Control Sample	98	101	100	103
LCSD 160-405438/6	Lab Control Sample Dup	96	101	101	104
MB 160-405438/8	Method Blank	99	101	102	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32072-8	B3KFF3	69	76	80	64	75	80
160-32072-8 MS	B3KFF3	81	80	82	75	78	87
160-32072-8 MSD	B3KFF3	85	81	73	65	73	90
160-32072-9	B3KFM1	77	80	83	67	80	86
160-32072-10 - DL	B3KFN9	0 X	0 X	0 X	0 X	0 X	0 X

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32072-1
SDG: SL32072-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404121/2-A	Lab Control Sample	77	75	75	73	73	80
MB 160-404121/1-A	Method Blank	67	74	75	63	69	77

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32072-1	B3KFF5	93	82
160-32072-1 MS	B3KFF5	75	70 X
160-32072-1 MSD	B3KFF5	87	80
160-32072-2	B3KFM3	71 X	73
160-32072-3	B3KFP7	95	86
160-32072-4	B3KFJ6	88	83
160-32072-5	B3KFK2	83	87
160-32072-6	B3KFJ9	77	77
160-32072-7	B3L195	88	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403934/2-A	Lab Control Sample	94	92
MB 160-403934/1-A	Method Blank	89	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

GEL LABORATORIES LLC

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QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465551**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1828529											
QC1204172965 LCS											
Diesel Range Organics	66700				69400	UG/KG		104	(70%-130%)	LXA1	12/10/18 04:23
**o-Terphenyl	667				622	UG/KG		93	(50%-150%)		
QC1204172964 MB											
Diesel Range Organics				U	2160	UG/KG					12/10/18 03:43
**o-Terphenyl	666				541	UG/KG		81	(50%-150%)		
QC1204172968 465551005 MS											
Diesel Range Organics	71900	U	2340		72800	UG/KG		101	(70%-130%)		12/10/18 07:38
**o-Terphenyl	719		671		659	UG/KG		92	(50%-150%)		
QC1204172969 465551005 MSD											
Diesel Range Organics	71900	U	2340		66300	UG/KG	9	92	(0%-20%)		12/10/18 08:17
**o-Terphenyl	719		671		568	UG/KG		79	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL465551

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204172964	MB for batch 1828518	81
1204172965	LCS for batch 1828518	93
465551005	B3MMX5	93
1204172968	B3MMX5MS	92
1204172969	B3MMX5MSD	79
465551006	B3MMX6	90
465551007	B3MMX7	86
465551008	B3MMX8	105
465551009	B3MMY8	88
465551010	B3MN09	83
465551011	B3MN11	73

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 8, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465551**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1826649										
QC1204168856 LCS										
Gasoline Range Organics	500			480	UG/KG		96	(70%-130%)	RXY1	11/28/18 12:23
**Bromofluorobenzene	50.0			42.4	UG/KG		85	(50%-150%)		
QC1204169369 LCS										
Gasoline Range Organics	500			441	UG/KG		88	(70%-130%)		11/29/18 13:13
**Bromofluorobenzene	50.0			39.2	UG/KG		78	(50%-150%)		
QC1204168855 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/28/18 12:51
**Bromofluorobenzene	50.0			42.7	UG/KG		85	(50%-150%)		
QC1204169368 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/29/18 13:41
**Bromofluorobenzene	50.0			38.3	UG/KG		77	(50%-150%)		
QC1204168859 465551008 PS										
Gasoline Range Organics	500	U	0.00	486	ug/L		97	(70%-130%)		11/29/18 16:30
**Bromofluorobenzene	50.0		43.2	35.0	ug/L		70	(50%-150%)		
QC1204168862 465551008 PSD										
Gasoline Range Organics	500	U	0.00	439	ug/L	10	88	(0%-20%)		11/29/18 16:58
**Bromofluorobenzene	50.0		43.2	31.7	ug/L		63	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465551

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204168856	LCS for batch 1826647	85
1204168855	MB for batch 1826647	85
465551005	B3MMX5	71
465551006	B3MMX6	72
465551007	B3MMX7	73
465551008	B3MMX8	86
465551009	B3MMY8	82
465551010	B3MN09	74
1204169369	LCS for batch 1826647	78
1204169368	MB for batch 1826647	77
1204168859	B3MMX8PS	70
1204168862	B3MMX8PSD	63
465551011	B3MN11	76

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465631**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1828529											
QC1204172965 LCS											
Diesel Range Organics	66700				69400	UG/KG		104	(70%-130%)	LXA1	12/10/18 04:23
**o-Terphenyl	667				622	UG/KG		93	(50%-150%)		
QC1204172964 MB											
Diesel Range Organics				U	2160	UG/KG					12/10/18 03:43
**o-Terphenyl	666				541	UG/KG		81	(50%-150%)		
QC1204172970 465631012 MS											
Diesel Range Organics	70000	U	2270		65700	UG/KG		94	(70%-130%)		12/10/18 14:47
**o-Terphenyl	700		665		598	UG/KG		85	(50%-150%)		
QC1204172971 465631012 MSD											
Diesel Range Organics	69900	U	2270		74900	UG/KG	13	107	(0%-20%)		12/10/18 15:26
**o-Terphenyl	699		665		686	UG/KG		98	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL465631

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
465631016	B3MN02	84
465631017	B3MN03	66
465631018	B3MN04	67
465631019	B3MN10	63
1204172964	MB for batch 1828518	81
1204172965	LCS for batch 1828518	93
465631012	B3MMX9	95
1204172970	B3MMX9MS	85
1204172971	B3MMX9MSD	98
465631013	B3MMY0	83
465631014	B3MMY5	72
465631015	B3MMY6	108

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 8, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465631**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1827392										
QC1204170566 LCS										
Gasoline Range Organics	500			441	UG/KG		88	(70%-130%)	RXY1	11/30/18 13:14
**Bromofluorobenzene	50.0			43.9	UG/KG		88	(50%-150%)		
QC1204170565 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/30/18 13:42
**Bromofluorobenzene	50.0			42.1	UG/KG		84	(50%-150%)		
QC1204170567 465631016 PS										
Gasoline Range Organics	500 U	0.00		399	ug/L		80	(70%-130%)		11/30/18 21:38
**Bromofluorobenzene	50.0	40.4		36.7	ug/L		73	(50%-150%)		
QC1204170568 465631016 PSD										
Gasoline Range Organics	500 U	0.00		410	ug/L	3	82	(0%-20%)		11/30/18 22:06
**Bromofluorobenzene	50.0	40.4		35.9	ug/L		72	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465631

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204170566	LCS for batch 1827391	88
1204170565	MB for batch 1827391	84
465631012	B3MMX9	73
465631013	B3MMY0	81
465631014	B3MMY5	71
465631015	B3MMY6	61
465631016	B3MN02	81
465631017	B3MN03	67
465631018	B3MN04	89
465631019	B3MN10	71
1204170567	B3MN02PS	73
1204170568	B3MN02PSD	72

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465731**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1828539											
QC1204173027 LCS											
Diesel Range Organics	66600				57800	UG/KG		87	(70%-130%)	LXA1	12/08/18 16:17
**o-Terphenyl	666				536	UG/KG		80	(50%-150%)		
QC1204173026 MB											
Diesel Range Organics				U	2160	UG/KG					12/08/18 15:38
**o-Terphenyl	666				460	UG/KG		69	(50%-150%)		
QC1204173028 465731001 MS											
Diesel Range Organics	72200	U	2350		66400	UG/KG		92	(70%-130%)		12/08/18 17:35
**o-Terphenyl	722		465		588	UG/KG		81	(50%-150%)		
QC1204173029 465731001 MSD											
Diesel Range Organics	72200	U	2350		59000	UG/KG	12	82	(0%-20%)		12/08/18 18:14
**o-Terphenyl	722		465		536	UG/KG		74	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL465731

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204173026	MB for batch 1828534	69
1204173027	LCS for batch 1828534	80
465731001	B3MMY3	64
1204173028	B3MMY3MS	81
1204173029	B3MMY3MSD	74
465731002	B3MMY2	77
465731003	B3MN01	69
465731004	B3MN06	77
465731005	B3MN12	60
465731006	B3MMY1	75
465731007	B3MN07	85
465731008	B3MMY4	67
465731009	B3MMY9	88
465731010	B3MN05	89
465731011	B3MMX4	83
465731012	B3MMX3	92
465731013	B3MN00	82
465731014	B3MMY7	68
465731015	B3MN08	83

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 12, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465731**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1827527										
QC1204170836 LCS										
Gasoline Range Organics	500			486	UG/KG		97	(70%-130%)	RXY1	12/01/18 13:34
**Bromofluorobenzene	50.0			43.1	UG/KG		86	(50%-150%)		
QC1204170837 LCS										
Gasoline Range Organics	500			418	UG/KG		84	(70%-130%)		12/04/18 12:39
**Bromofluorobenzene	50.0			43.6	UG/KG		87	(50%-150%)		
QC1204170834 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/01/18 14:02
**Bromofluorobenzene	50.0			42.1	UG/KG		84	(50%-150%)		
QC1204170835 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/04/18 13:07
**Bromofluorobenzene	50.0			40.6	UG/KG		81	(50%-150%)		
QC1204170838 465731007 PS										
Gasoline Range Organics	500	U	0.00	351	ug/L		70	(70%-130%)		12/04/18 23:25
**Bromofluorobenzene	50.0		38.3	39.1	ug/L		78	(50%-150%)		
QC1204170839 465731007 PSD										
Gasoline Range Organics	500	U	0.00	363	ug/L	3	73	(0%-20%)		12/04/18 23:53
**Bromofluorobenzene	50.0		38.3	40.7	ug/L		81	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465731

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204170836	LCS for batch 1827526	86
1204170834	MB for batch 1827526	84
465731001	B3MMY3	87
465731002	B3MMY2	71
465731003	B3MN01	84
465731004	B3MN06	87
465731005	B3MN12	87
1204170837	LCS for batch 1827526	87
1204170835	MB for batch 1827526	81
465731006	B3MMY1	62
465731007	B3MN07	77
465731008	B3MMY4	87
465731009	B3MMY9	85
465731010	B3MN05	77
465731011	B3MMX4	82
465731012	B3MMX3	80
465731013	B3MN00	78
465731014	B3MMY7	80
465731015	B3MN08	79
1204170838	B3MN07PS	78
1204170839	B3MN07PSD	81

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL32015-1, SL32017-1, SL32070-1, SL32072-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L192	11/26/18	Soil	C	8081B
B3KFH7	11/26/18	Soil	C	8081B
B3KFL7	11/26/18	Soil	C	8081B
B3KFJ3	11/26/18	Soil	C	8081B
B3KFN5	11/26/18	Soil	C	8081B
B3KFL1	11/26/18	Soil	C	8081B
B3KFM9	11/26/18	Soil	C	8081B
B3KFR3	11/26/18	Soil	C	8081B
B3KFN2	11/26/18	Soil	C	8081B
B3KFK8	11/26/18	Soil	C	8081B
B3KFR0	11/26/18	Soil	C	8081B
B3KFJ0	11/26/18	Soil	C	8081B
B3KFH4	11/26/18	Soil	C	8081B
B3KFF8	11/26/18	Soil	C	8081B
B3KFH1	11/26/18	Soil	C	8081B
B3KFP1	11/28/18	Soil	C	8081B
B3KFL4	11/28/18	Soil	C	8081B
B3KFM0	11/28/18	Soil	C	8081B
B3KFM6	11/28/18	Soil	C	8081B
B3KFK5	11/28/18	Soil	C	8081B
B3KFP4	11/28/18	Soil	C	8081B
B3KFF2	11/28/18	Soil	C	8081B
B3KFN8	11/28/18	Soil	C	8081B
B3KFF5	11/28/18	Soil	C	8081B
B3KFM3	11/28/18	Soil	C	8081B
B3KFP7	11/28/18	Soil	C	8081B
B3KFJ6	11/28/18	Soil	C	8081B
B3KFK2	11/28/18	Soil	C	8081B
B3KFJ9	11/28/18	Soil	C	8081B
B3L195	11/28/18	Soil	C	8081B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32015-1, the MS and MSD recoveries for endosulfan I and endosulfan II were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32017-1, the MS and MSD recoveries for endosulfan I and endosulfan II were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32072-1, the MS and/or MSD recoveries for 4,4'-DDD, aldrin, alpha-BHC, beta-BHC, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-BHC, heptachlor and trans-chlordane were below the lower acceptance limit but ≥20%. All associated sample results should be qualified as estimates and flagged "UJ" for non-detects and "J" for detect sample results. See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32015-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32017-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that an LCS analysis was not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPDs were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. CRDLs for other pesticides were not provided in the SAP.

- **Completeness**

SDG SL32015-1, SL32017-1, SL32070-1 and SL32072-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were matrix spike and LCS infractions. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
endosulfan I endosulfan II	UJ	B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1, B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1	Low matrix spike recoveries and low LCS recoveries
4,4'-DDD, aldrin, alpha-BHC, beta-BHC, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-BHC (Lindane), heptachlor	UJ	B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195	Low matrix spike recoveries
trans-Chlordane	J	B3KFF5, B3KFM3, B3KFJ6	Low matrix spike recoveries
trans-Chlordane	UJ	B3KFP7, B3KFK2, B3KFJ9, B3L195	Low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL32015-1. SL32017-1. SL32070-1. SL32072-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL32015-1: B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1					
SDG SL32017-1: B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1					
SDG SL32070-1: B3KFP1, B3KFL4, B3KFM0, B3KFM6, B3KFK5, B3KFP4, B3KFF2, B3KFN8					
SDG SL32072-1: B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL32015-1: endosulfan I 45%/47%, endosulfan II 51%/53%

SDG SL32017-1 - endosulfan I 44%/44%, endosulfan II 49%/48%

SDG SL32072-1 - 4,4-DDD 67% (MS), aldrin 66% (MS), alpha-BHC 68% (MS), beta-BHC 66% (MS), endosulfan I 67% (MS), endosulfan II 66% (MS), endosulfan sulfate 60%/68%, endrin 66% (MS), endrin aldehyde 64% (MS), endrin ketone 66% (MS), gamma-BHC 66% (MS), heptachlor 65% (MS), trans-chlordane 59% (MS)

LCS

SDG SL32015-1 - endosulfan I 47%, endosulfan II 52%

SDG SL32017-1 - endosulfan I 47%, endosulfan II 52%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for 4,4-DDD, 4,4-DDE, 4,4-DDT and dieldrin were met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32015-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFH5
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	35	U	3510	3310		ug/Kg	☼	94	33 - 140	3	30
Fluoranthene	53	U	3510	2850		ug/Kg	☼	81	45 - 109	2	30
Fluorene	48	U	3510	2710		ug/Kg	☼	77	45 - 109	0	30
Hexachlorobenzene	45	U	3510	2820		ug/Kg	☼	80	48 - 113	2	30
Hexachlorobutadiene	42	U	3510	2400		ug/Kg	☼	68	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3510	2100		ug/Kg	☼	60	21 - 144	2	30
Hexachloroethane	37	U	3510	2040		ug/Kg	☼	58	44 - 102	0	30
Indeno[1,2,3-cd]pyrene	67	U	3510	2490		ug/Kg	☼	71	30 - 136	4	30
Isophorone	40	U	3510	2460		ug/Kg	☼	70	48 - 100	2	30
Naphthalene	38	U	3510	2430		ug/Kg	☼	69	54 - 98	2	30
Nitrobenzene	43	U	3510	2620		ug/Kg	☼	75	51 - 106	3	30
N-Nitrosodi-n-propylamine	43	U	3510	2710		ug/Kg	☼	77	47 - 104	2	30
Pentachlorophenol	350	U	3510	2430		ug/Kg	☼	69	23 - 116	3	30
Phenanthrene	45	U	3510	2860		ug/Kg	☼	81	53 - 106	1	30
Phenol	40	U	3510	2670		ug/Kg	☼	76	41 - 100	2	30
Pyrene	77	U	3510	2840		ug/Kg	☼	81	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*74*		*47 - 125*
2-Fluorobiphenyl (Surr)	*76*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*81*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Toxaphene	23	U	67	23	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*	*11/29/18 14:41*	*12/20/18 15:59*	*1*
Tetrachloro-m-xylene	*87*		*71 - 111*	*11/29/18 14:41*	*12/20/18 15:59*	*1*

Lab Sample ID: LCS 160-403441/2-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.3		ug/Kg		86	72 - 117
4,4'-DDE	16.7	14.8		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	13.8		ug/Kg		83	70 - 102
alpha-BHC	16.7	14.2		ug/Kg		85	72 - 111
alpha-Chlordane	16.7	14.4		ug/Kg		86	72 - 105
beta-BHC	16.7	13.4		ug/Kg		80	68 - 102
delta-BHC	16.7	13.8		ug/Kg		83	72 - 117
Dieldrin	16.7	14.6		ug/Kg		88	72 - 108
Endosulfan I	16.7	7.82		ug/Kg		47	34 - 96
Endosulfan II	16.7	8.73		ug/Kg		52	46 - 96
Endosulfan sulfate	16.7	13.3		ug/Kg		80	68 - 108
Endrin	16.7	13.8		ug/Kg		83	76 - 116
Endrin aldehyde	16.7	12.7		ug/Kg		76	54 - 97
Endrin ketone	16.7	14.1		ug/Kg		85	71 - 113
gamma-BHC (Lindane)	16.7	13.8		ug/Kg		83	71 - 107
Heptachlor	16.7	13.9		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.2		ug/Kg		85	72 - 107
Methoxychlor	16.7	14.3		ug/Kg		86	71 - 124
trans-Chlordane	16.7	14.4		ug/Kg		87	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32015-11 MS
Matrix: Soil
Analysis Batch: 406890

Client Sample ID: B3L192
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U	18.1	14.6		ug/Kg	☼	81	60 - 121
4,4'-DDE	0.91	U	18.1	15.4		ug/Kg	☼	85	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.68	U	18.1	16.1		ug/Kg	☼	89	59 - 122
Aldrin	0.61	U	18.1	14.6		ug/Kg	☼	81	57 - 110
alpha-BHC	0.42	U	18.1	14.7		ug/Kg	☼	81	62 - 117
alpha-Chlordane	1.0	U	18.1	15.7		ug/Kg	☼	87	58 - 114
beta-BHC	0.49	U	18.1	14.0		ug/Kg	☼	77	61 - 108
delta-BHC	0.37	U	18.1	14.6		ug/Kg	☼	81	64 - 121
Dieldrin	0.23	U	18.1	15.3		ug/Kg	☼	85	57 - 114
Endosulfan I	0.61	U	18.1	8.19		ug/Kg	☼	45	31 - 89
Endosulfan II	0.31	U	18.1	9.20		ug/Kg	☼	51	40 - 93
Endosulfan sulfate	0.37	U	18.1	13.6		ug/Kg	☼	75	56 - 112
Endrin	0.36	U	18.1	14.3		ug/Kg	☼	79	64 - 125
Endrin aldehyde	0.42	U	18.1	13.3		ug/Kg	☼	74	45 - 101
Endrin ketone	0.45	U	18.1	14.7		ug/Kg	☼	81	59 - 115
gamma-BHC (Lindane)	0.51	U	18.1	14.4		ug/Kg	☼	80	61 - 113
Heptachlor	0.31	U	18.1	14.4		ug/Kg	☼	80	33 - 150
Heptachlor epoxide	0.51	U	18.1	15.1		ug/Kg	☼	84	60 - 114
Methoxychlor	0.89	U	18.1	14.7		ug/Kg	☼	82	58 - 130
trans-Chlordane	0.81	J	18.1	15.6		ug/Kg	☼	82	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*72 - 115*
Tetrachloro-m-xylene	*82*		*71 - 111*

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U	18.0	15.0		ug/Kg	☼	83	60 - 121	3	30
4,4'-DDE	0.91	U	18.0	15.8		ug/Kg	☼	88	63 - 111	3	30
4,4'-DDT	0.68	U	18.0	16.6		ug/Kg	☼	92	59 - 122	3	30
Aldrin	0.61	U	18.0	14.7		ug/Kg	☼	81	57 - 110	0	30
alpha-BHC	0.42	U	18.0	14.6		ug/Kg	☼	81	62 - 117	1	30
alpha-Chlordane	1.0	U	18.0	16.1		ug/Kg	☼	90	58 - 114	3	30
beta-BHC	0.49	U	18.0	14.3		ug/Kg	☼	79	61 - 108	2	30
delta-BHC	0.37	U	18.0	15.3		ug/Kg	☼	85	64 - 121	5	30
Dieldrin	0.23	U	18.0	15.9		ug/Kg	☼	88	57 - 114	4	30
Endosulfan I	0.61	U	18.0	8.45		ug/Kg	☼	47	31 - 89	3	30
Endosulfan II	0.31	U	18.0	9.48		ug/Kg	☼	53	40 - 93	3	30
Endosulfan sulfate	0.37	U	18.0	14.2		ug/Kg	☼	79	56 - 112	5	30
Endrin	0.36	U	18.0	14.9		ug/Kg	☼	83	64 - 125	4	30
Endrin aldehyde	0.42	U	18.0	14.0		ug/Kg	☼	78	45 - 101	5	30
Endrin ketone	0.45	U	18.0	15.1		ug/Kg	☼	84	59 - 115	3	30
gamma-BHC (Lindane)	0.51	U	18.0	14.5		ug/Kg	☼	81	61 - 113	1	30
Heptachlor	0.31	U	18.0	14.2		ug/Kg	☼	79	33 - 150	1	30
Heptachlor epoxide	0.51	U	18.0	15.5		ug/Kg	☼	86	60 - 114	2	30
Methoxychlor	0.89	U	18.0	15.0		ug/Kg	☼	83	58 - 130	2	30
trans-Chlordane	0.81	J	18.0	16.1		ug/Kg	☼	85	62 - 114	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	89		72 - 115
Tetrachloro-m-xylene	83		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403415/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1248	11	U	33	11	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1254	13	U	33	13	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1260	10	U	33	10	ug/Kg		11/29/18 12:02	12/13/18 17:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	83		23 - 146	11/29/18 12:02	12/13/18 17:12	1

Lab Sample ID: LCS 160-403415/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	154		ug/Kg		93	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	166		ug/Kg	☼	92	23 - 140
Aroclor 1260	11	U	180	162		ug/Kg	☼	90	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	182	163		ug/Kg	☼	90	23 - 140	2	30
Aroclor 1260	11	U	182	159		ug/Kg	☼	87	20 - 131	2	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32015-4	B3KFR4	79	80	78	70	78	84
160-32015-5 - DL	B3KFN3	63	79	75	67	77	88
160-32015-6	B3L193	83	87	88	74	89	91
160-32015-7	B3KFH8	81	84	82	71	83	87
160-32015-8	B3KFJ1	75	79	76	68	77	84
160-32015-9	B3L1B0	73	86	88	75	90	88
160-32015-10	B3KFH2	81	84	79	72	81	86
160-32015-17 - DL	B3KFL2	67	79	78	69	80	82
160-32015-18	B3KFN6	77	82	83	72	84	92
160-32015-19	B3KFF9	73	79	79	70	82	84
160-32015-20 - DL	B3KFK9	67	81	82	72	84	91

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32015-11	B3L192	85	81
160-32015-11 MS	B3L192	86	82
160-32015-11 MSD	B3L192	89	83
160-32015-12	B3KFH7	83	78
160-32015-13	B3KFL7	91	84
160-32015-14	B3KFJ3	93	88
160-32015-15	B3KFN5	86	81

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32015-16	B3KFL1	80	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-32015-11	B3L192	85
160-32015-11 MS	B3L192	86
160-32015-11 MSD	B3L192	81
160-32015-12	B3KFH7	79
160-32015-13	B3KFL7	79
160-32015-14	B3KFJ3	79
160-32015-15	B3KFN5	80
160-32015-16	B3KFL1	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-403415/2-A	Lab Control Sample	92
MB 160-403415/1-A	Method Blank	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32017-1 MSD
Matrix: Soil
Analysis Batch: 404279

Client Sample ID: B3KFL8
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexachloroethane	37	U	3520	2310		ug/Kg	☼	66	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	67	U	3520	2630		ug/Kg	☼	75	30 - 136	4	30
Isophorone	40	U	3520	2650		ug/Kg	☼	75	48 - 100	1	30
Naphthalene	38	U	3520	2720		ug/Kg	☼	77	54 - 98	2	30
Nitrobenzene	43	U	3520	2870		ug/Kg	☼	81	51 - 106	1	30
N-Nitrosodi-n-propylamine	43	U	3520	2960		ug/Kg	☼	84	47 - 104	4	30
Pentachlorophenol	350	U	3520	2740		ug/Kg	☼	78	23 - 116	6	30
Phenanthrene	45	U	3520	3070		ug/Kg	☼	87	53 - 106	4	30
Phenol	40	U	3520	2960		ug/Kg	☼	84	41 - 100	5	30
Pyrene	78	U	3520	3110		ug/Kg	☼	88	39 - 130	4	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*83*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*80*		*44 - 120*
Phenol-d5 (Surr)	*87*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Toxaphene	23	U	67	23	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		72 - 115	11/29/18 14:41	12/20/18 15:59	1
Tetrachloro-m-xylene	87		71 - 111	11/29/18 14:41	12/20/18 15:59	1

Lab Sample ID: LCS 160-403441/2-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.3		ug/Kg		86	72 - 117
4,4'-DDE	16.7	14.8		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	13.8		ug/Kg		83	70 - 102
alpha-BHC	16.7	14.2		ug/Kg		85	72 - 111
alpha-Chlordane	16.7	14.4		ug/Kg		86	72 - 105
beta-BHC	16.7	13.4		ug/Kg		80	68 - 102
delta-BHC	16.7	13.8		ug/Kg		83	72 - 117
Dieldrin	16.7	14.6		ug/Kg		88	72 - 108
Endosulfan I	16.7	7.82		ug/Kg		47	34 - 96
Endosulfan II	16.7	8.73		ug/Kg		52	46 - 96
Endosulfan sulfate	16.7	13.3		ug/Kg		80	68 - 108
Endrin	16.7	13.8		ug/Kg		83	76 - 116
Endrin aldehyde	16.7	12.7		ug/Kg		76	54 - 97
Endrin ketone	16.7	14.1		ug/Kg		85	71 - 113
gamma-BHC (Lindane)	16.7	13.8		ug/Kg		83	71 - 107
Heptachlor	16.7	13.9		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.2		ug/Kg		85	72 - 107
Methoxychlor	16.7	14.3		ug/Kg		86	71 - 124
trans-Chlordane	16.7	14.4		ug/Kg		87	71 - 108

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	90		72 - 115
Tetrachloro-m-xylene	86		71 - 111

Lab Sample ID: 160-32017-3 MS
Matrix: Soil
Analysis Batch: 406890

Client Sample ID: B3KFM9
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.6	13.4		ug/Kg	☼	76	60 - 121
4,4'-DDE	0.88	U	17.6	14.8		ug/Kg	☼	84	63 - 111
4,4'-DDT	0.65	U	17.6	15.1		ug/Kg	☼	86	59 - 122
Aldrin	0.60	U	17.6	14.5		ug/Kg	☼	82	57 - 110
alpha-BHC	0.40	U	17.6	14.9		ug/Kg	☼	85	62 - 117
alpha-Chlordane	0.98	U	17.6	15.3		ug/Kg	☼	87	58 - 114
beta-BHC	0.48	U	17.6	14.5		ug/Kg	☼	82	61 - 108
delta-BHC	0.36	U	17.6	14.7		ug/Kg	☼	84	64 - 121
Dieldrin	0.22	U	17.6	14.8		ug/Kg	☼	84	57 - 114
Endosulfan I	0.59	U	17.6	7.71		ug/Kg	☼	44	31 - 89

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32017-3 MS
Matrix: Soil
Analysis Batch: 406890

Client Sample ID: B3KFM9
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Endosulfan II	0.30	U	17.6	8.53		ug/Kg	☼	49	40 - 93
Endosulfan sulfate	0.35	U	17.6	12.3		ug/Kg	☼	70	56 - 112
Endrin	0.34	U	17.6	13.8		ug/Kg	☼	79	64 - 125
Endrin aldehyde	0.40	U	17.6	12.6		ug/Kg	☼	72	45 - 101
Endrin ketone	0.43	U	17.6	13.5		ug/Kg	☼	77	59 - 115
gamma-BHC (Lindane)	0.50	U	17.6	14.6		ug/Kg	☼	83	61 - 113
Heptachlor	0.30	U	17.6	14.4		ug/Kg	☼	82	33 - 150
Heptachlor epoxide	0.49	U	17.6	14.7		ug/Kg	☼	84	60 - 114
Methoxychlor	0.86	U	17.6	13.3		ug/Kg	☼	76	58 - 130
trans-Chlordane	0.86	J	17.6	15.5		ug/Kg	☼	83	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*83*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32017-3 MSD
Matrix: Soil
Analysis Batch: 406890

Client Sample ID: B3KFM9
Prep Type: Total/NA
Prep Batch: 403441

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.4	13.6		ug/Kg	☼	78	60 - 121	1	30
4,4'-DDE	0.88	U	17.5	14.8		ug/Kg	☼	85	63 - 111	0	30
4,4'-DDT	0.65	U	17.4	14.9		ug/Kg	☼	85	59 - 122	1	30
Aldrin	0.60	U	17.4	14.3		ug/Kg	☼	82	57 - 110	1	30
alpha-BHC	0.40	U	17.4	14.6		ug/Kg	☼	84	62 - 117	2	30
alpha-Chlordane	0.98	U	17.4	15.3		ug/Kg	☼	88	58 - 114	0	30
beta-BHC	0.48	U	17.4	16.8		ug/Kg	☼	96	61 - 108	15	30
delta-BHC	0.36	U	17.4	14.9		ug/Kg	☼	85	64 - 121	1	30
Dieldrin	0.22	U	17.5	14.6		ug/Kg	☼	84	57 - 114	2	30
Endosulfan I	0.59	U	17.4	7.59		ug/Kg	☼	44	31 - 89	2	30
Endosulfan II	0.30	U	17.4	8.41		ug/Kg	☼	48	40 - 93	1	30
Endosulfan sulfate	0.35	U	17.4	12.1		ug/Kg	☼	69	56 - 112	2	30
Endrin	0.34	U	17.5	13.6		ug/Kg	☼	78	64 - 125	1	30
Endrin aldehyde	0.40	U	17.4	12.1		ug/Kg	☼	69	45 - 101	4	30
Endrin ketone	0.43	U	17.5	13.2		ug/Kg	☼	76	59 - 115	2	30
gamma-BHC (Lindane)	0.50	U	17.5	14.4		ug/Kg	☼	82	61 - 113	1	30
Heptachlor	0.30	U	17.4	14.2		ug/Kg	☼	82	33 - 150	1	30
Heptachlor epoxide	0.49	U	17.4	14.6		ug/Kg	☼	84	60 - 114	1	30
Methoxychlor	0.86	U	17.4	13.3		ug/Kg	☼	77	58 - 130	1	30
trans-Chlordane	0.86	J	17.4	15.5		ug/Kg	☼	84	62 - 114	0	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*
Tetrachloro-m-xylene	*87*		*71 - 111*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32017-3	B3KFM9	73	76
160-32017-3 MS	B3KFM9	83	86
160-32017-3 MSD	B3KFM9	98	87
160-32017-4	B3KFR3	78	81
160-32017-5	B3KFN2	84	80
160-32017-6	B3KFK8	74	79
160-32017-7	B3KFR0	79	80
160-32017-8	B3KFJ0	84	83
160-32017-9	B3KFH4	76	75
160-32017-10	B3KFF8	75	75
160-32017-11	B3KFH1	86	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32070-1 MSD
Matrix: Soil
Analysis Batch: 404534

Client Sample ID: B3KFF6
Prep Type: Total/NA
Prep Batch: 404156

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3630	3290		ug/Kg	☼	91	33 - 140	6	30
Fluoranthene	55	U	3630	2810		ug/Kg	☼	77	45 - 109	6	30
Fluorene	50	U	3630	2670		ug/Kg	☼	74	45 - 109	9	30
Hexachlorobenzene	46	U	3630	2590		ug/Kg	☼	71	48 - 113	10	30
Hexachlorobutadiene	44	U	3630	2420		ug/Kg	☼	67	48 - 109	4	30
Hexachlorocyclopentadiene	360	U	3630	2210		ug/Kg	☼	61	21 - 144	6	30
Hexachloroethane	38	U	3630	2270		ug/Kg	☼	63	44 - 102	0	30
Indeno[1,2,3-cd]pyrene	69	U	3630	2170		ug/Kg	☼	60	30 - 136	1	30
Isophorone	41	U	3630	2240		ug/Kg	☼	62	48 - 100	1	30
Naphthalene	39	U	3630	2490		ug/Kg	☼	69	54 - 98	2	30
Nitrobenzene	44	U	3630	2470		ug/Kg	☼	68	51 - 106	3	30
N-Nitrosodi-n-propylamine	44	U	3630	2450		ug/Kg	☼	68	47 - 104	4	30
Pentachlorophenol	360	U	3630	2470		ug/Kg	☼	68	23 - 116	9	30
Phenanthrene	46	U	3630	2790		ug/Kg	☼	77	53 - 106	6	30
Phenol	41	U	3630	2420		ug/Kg	☼	67	41 - 100	5	30
Pyrene	79	U	3630	2710		ug/Kg	☼	75	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*68*		*47 - 125*
2-Fluorobiphenyl (Surr)	*71*		*59 - 110*
2-Fluorophenol (Surr)	*72*		*54 - 102*
Nitrobenzene-d5 (Surr)	*66*		*44 - 120*
Phenol-d5 (Surr)	*68*		*51 - 104*
Terphenyl-d14 (Surr)	*77*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403934/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403934

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-403934/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Toxaphene	23	U	67	23	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*89*		*72 - 115*	*12/03/18 16:14*	*12/21/18 01:32*	*1*
Tetrachloro-m-xylene	*86*		*71 - 111*	*12/03/18 16:14*	*12/21/18 01:32*	*1*

Lab Sample ID: LCS 160-403934/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.2		ug/Kg		85	72 - 117
4,4'-DDE	16.7	14.8		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.4		ug/Kg		86	70 - 102
alpha-BHC	16.7	14.9		ug/Kg		89	72 - 111
alpha-Chlordane	16.7	14.7		ug/Kg		88	72 - 105
beta-BHC	16.7	13.8		ug/Kg		83	68 - 102
delta-BHC	16.7	15.3		ug/Kg		92	72 - 117
Dieldrin	16.7	15.0		ug/Kg		90	72 - 108
Endosulfan I	16.7	13.9		ug/Kg		83	34 - 96
Endosulfan II	16.7	13.9		ug/Kg		83	46 - 96
Endosulfan sulfate	16.7	13.0		ug/Kg		78	68 - 108
Endrin	16.7	14.1		ug/Kg		84	76 - 116
Endrin aldehyde	16.7	12.9		ug/Kg		77	54 - 97
Endrin ketone	16.7	14.1		ug/Kg		85	71 - 113
gamma-BHC (Lindane)	16.7	14.5		ug/Kg		87	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.6		ug/Kg		88	72 - 107
Methoxychlor	16.7	14.8		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.7		ug/Kg		88	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*94*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U	17.7	14.3		ug/Kg	☼	81	60 - 121
4,4'-DDE	0.90	U	17.7	15.3		ug/Kg	☼	86	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.67	U	17.7	16.0		ug/Kg	☼	90	59 - 122
Aldrin	0.61	U	17.7	14.6		ug/Kg	☼	83	57 - 110
alpha-BHC	0.42	U	17.7	15.1		ug/Kg	☼	85	62 - 117
alpha-Chlordane	1.0	U	17.7	15.5		ug/Kg	☼	88	58 - 114
beta-BHC	0.49	U	17.7	14.1		ug/Kg	☼	80	61 - 108
delta-BHC	0.37	U	17.7	15.6		ug/Kg	☼	89	64 - 121
Dieldrin	0.23	U	17.7	15.4		ug/Kg	☼	87	57 - 114
Endosulfan I	0.61	U	17.7	14.3		ug/Kg	☼	81	31 - 89
Endosulfan II	0.31	U	17.7	14.0		ug/Kg	☼	79	40 - 93
Endosulfan sulfate	0.37	U	17.7	12.8		ug/Kg	☼	72	56 - 112
Endrin	0.36	U	17.7	14.4		ug/Kg	☼	81	64 - 125
Endrin aldehyde	0.42	U	17.7	12.9		ug/Kg	☼	73	45 - 101
Endrin ketone	0.45	U	17.7	14.2		ug/Kg	☼	80	59 - 115
gamma-BHC (Lindane)	0.51	U	17.7	14.7		ug/Kg	☼	83	61 - 113
Heptachlor	0.31	U	17.7	14.3		ug/Kg	☼	81	33 - 150
Heptachlor epoxide	0.51	U	17.7	15.2		ug/Kg	☼	86	60 - 114
Methoxychlor	0.89	U	17.7	15.9		ug/Kg	☼	90	58 - 130
trans-Chlordane	0.41	U	17.7	15.4		ug/Kg	☼	87	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*72 - 115*
Tetrachloro-m-xylene	*87*		*71 - 111*

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U	17.9	15.0		ug/Kg	☼	84	60 - 121	5	30
4,4'-DDE	0.90	U	17.9	15.6		ug/Kg	☼	87	63 - 111	2	30
4,4'-DDT	0.67	U	17.9	16.5		ug/Kg	☼	92	59 - 122	3	30
Aldrin	0.61	U	17.9	14.8		ug/Kg	☼	83	57 - 110	1	30
alpha-BHC	0.42	U	17.9	15.3		ug/Kg	☼	86	62 - 117	1	30
alpha-Chlordane	1.0	U	17.9	15.8		ug/Kg	☼	88	58 - 114	2	30
beta-BHC	0.49	U	17.9	14.4		ug/Kg	☼	81	61 - 108	2	30
delta-BHC	0.37	U	17.9	16.1		ug/Kg	☼	90	64 - 121	3	30
Dieldrin	0.23	U	17.9	15.6		ug/Kg	☼	87	57 - 114	1	30
Endosulfan I	0.61	U	17.9	14.5		ug/Kg	☼	81	31 - 89	1	30
Endosulfan II	0.31	U	17.9	14.7		ug/Kg	☼	82	40 - 93	4	30
Endosulfan sulfate	0.37	U	17.9	13.9		ug/Kg	☼	78	56 - 112	8	30
Endrin	0.36	U	17.9	14.7		ug/Kg	☼	82	64 - 125	2	30
Endrin aldehyde	0.42	U	17.9	13.5		ug/Kg	☼	76	45 - 101	5	30
Endrin ketone	0.45	U	17.9	15.1		ug/Kg	☼	84	59 - 115	6	30
gamma-BHC (Lindane)	0.51	U	17.9	14.9		ug/Kg	☼	83	61 - 113	1	30
Heptachlor	0.31	U	17.9	14.1		ug/Kg	☼	79	33 - 150	1	30
Heptachlor epoxide	0.51	U	17.9	15.3		ug/Kg	☼	86	60 - 114	1	30
Methoxychlor	0.89	U	17.9	16.5		ug/Kg	☼	92	58 - 130	4	30
trans-Chlordane	0.41	U	17.9	15.6		ug/Kg	☼	87	62 - 114	1	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	95		72 - 115
Tetrachloro-m-xylene	86		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403925/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1248	11	U	33	11	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1254	13	U	33	13	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1260	10	U	33	10	ug/Kg		12/03/18 13:56	12/05/18 19:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		23 - 146	12/03/18 13:56	12/05/18 19:08	1

Lab Sample ID: LCS 160-403925/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	149		ug/Kg		89	52 - 134
Aroclor 1260	167	157		ug/Kg		94	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	177	159		ug/Kg	☼	90	23 - 140
Aroclor 1260	11	U	177	166		ug/Kg	☼	94	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	179	158		ug/Kg	☼	88	23 - 140	1	30
Aroclor 1260	11	U	179	164		ug/Kg	☼	92	20 - 131	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32070-1
SDG: SL32070-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
160-32070-6	B3KFL5	75	74	75	61	70	81
160-32070-7	B3KFP8	79	77	76	60	72	83
160-32070-8 - DL	B3KFM7	76	83	73	64	72	90
160-32070-9	B3L196	75	77	75	59	73	84
160-32070-10	B3KFJ7	54	58 X	61	47	57	66
160-32070-11	B3KFP2	78	79	81	63	76	85
160-32070-12	B3KFK0	74	81	85	67	79	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
LCS 160-404156/2-A	Lab Control Sample	85	82	79	74	77	85
MB 160-404156/1-A	Method Blank	74	81	80	64	75	89

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32070-13	B3KFP1	92	90
160-32070-13 MS	B3KFP1	86	87
160-32070-13 MSD	B3KFP1	95	86
160-32070-14	B3KFL4	85	91
160-32070-15	B3KFM0	91	80
160-32070-16	B3KFM6	98	84
160-32070-17	B3KFK5	70 X	78
160-32070-18	B3KFP4	82	82
160-32070-19	B3KFF2	82	81
160-32070-20	B3KFN8	85	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	**Client Sample ID**	**DCB2 (72-115)**	**TCX2 (71-111)**
LCS 160-403934/2-A	Lab Control Sample	94	92
MB 160-403934/1-A	Method Blank	89	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**
160-32070-13	B3KFP1	91
160-32070-13 MS	B3KFP1	92
160-32070-13 MSD	B3KFP1	91
160-32070-14	B3KFL4	91
160-32070-15	B3KFM0	89
160-32070-16	B3KFM6	87
160-32070-17	B3KFK5	79
160-32070-18	B3KFP4	84
160-32070-19	B3KFF2	84
160-32070-20	B3KFN8	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**
LCS 160-403925/2-A	Lab Control Sample	86
MB 160-403925/1-A	Method Blank	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32072-8 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3KFF3
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3600	3530		ug/Kg	☼	98	33 - 140	1	30
Fluoranthene	54	U	3600	3010		ug/Kg	☼	84	45 - 109	1	30
Fluorene	49	U	3600	3120		ug/Kg	☼	87	45 - 109	4	30
Hexachlorobenzene	45	U	3600	2960		ug/Kg	☼	82	48 - 113	2	30
Hexachlorobutadiene	43	U	3600	2420		ug/Kg	☼	67	48 - 109	9	30
Hexachlorocyclopentadiene	350	U	3600	1860		ug/Kg	☼	52	21 - 144	24	30
Hexachloroethane	37	U	3600	2060		ug/Kg	☼	57	44 - 102	15	30
Indeno[1,2,3-cd]pyrene	67	U	3600	4780	y	ug/Kg	☼	133	30 - 136	72	30
Isophorone	40	U	3600	2240		ug/Kg	☼	62	48 - 100	10	30
Naphthalene	38	U	3600	2500		ug/Kg	☼	70	54 - 98	9	30
Nitrobenzene	43	U	3600	2410		ug/Kg	☼	67	51 - 106	12	30
N-Nitrosodi-n-propylamine	43	U	3600	2510		ug/Kg	☼	70	47 - 104	11	30
Pentachlorophenol	350	U	3600	2710		ug/Kg	☼	75	23 - 116	5	30
Phenanthrene	45	U	3600	3040		ug/Kg	☼	84	53 - 106	2	30
Phenol	40	U	3600	2620		ug/Kg	☼	73	41 - 100	6	30
Pyrene	78	U	3600	3110		ug/Kg	☼	86	39 - 130	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*85*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*73*		*54 - 102*
Nitrobenzene-d5 (Surr)	*65*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403934/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403934

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-403934/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
Toxaphene	23	U	67	23	ug/Kg		12/03/18 16:14	12/21/18 01:32	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/03/18 16:14	12/21/18 01:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*89*		*72 - 115*	*12/03/18 16:14*	*12/21/18 01:32*	*1*
Tetrachloro-m-xylene	*86*		*71 - 111*	*12/03/18 16:14*	*12/21/18 01:32*	*1*

Lab Sample ID: LCS 160-403934/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.2		ug/Kg		85	72 - 117
4,4'-DDE	16.7	14.8		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.4		ug/Kg		86	70 - 102
alpha-BHC	16.7	14.9		ug/Kg		89	72 - 111
alpha-Chlordane	16.7	14.7		ug/Kg		88	72 - 105
beta-BHC	16.7	13.8		ug/Kg		83	68 - 102
delta-BHC	16.7	15.3		ug/Kg		92	72 - 117
Dieldrin	16.7	15.0		ug/Kg		90	72 - 108
Endosulfan I	16.7	13.9		ug/Kg		83	34 - 96
Endosulfan II	16.7	13.9		ug/Kg		83	46 - 96
Endosulfan sulfate	16.7	13.0		ug/Kg		78	68 - 108
Endrin	16.7	14.1		ug/Kg		84	76 - 116
Endrin aldehyde	16.7	12.9		ug/Kg		77	54 - 97
Endrin ketone	16.7	14.1		ug/Kg		85	71 - 113
gamma-BHC (Lindane)	16.7	14.5		ug/Kg		87	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.6		ug/Kg		88	72 - 107
Methoxychlor	16.7	14.8		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.7		ug/Kg		88	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*94*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U	18.1	12.1		ug/Kg	☼	67	60 - 121
4,4'-DDE	0.91	U	18.1	13.4		ug/Kg	☼	74	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.68	U	18.1	13.7		ug/Kg	☼	76	59 - 122
Aldrin	0.62	U	18.1	12.0		ug/Kg	☼	66	57 - 110
alpha-BHC	0.42	U	18.1	12.3		ug/Kg	☼	68	62 - 117
alpha-Chlordane	9.2	P	18.1	21.9		ug/Kg	☼	70	58 - 114
beta-BHC	0.50	U	18.1	12.0		ug/Kg	☼	66	61 - 108
delta-BHC	0.37	U	18.1	13.1		ug/Kg	☼	72	64 - 121
Dieldrin	0.23	U	18.1	12.8		ug/Kg	☼	71	57 - 114
Endosulfan I	0.62	U	18.1	12.1		ug/Kg	☼	67	31 - 89
Endosulfan II	0.32	U	18.1	12.0		ug/Kg	☼	66	40 - 93
Endosulfan sulfate	0.37	U	18.1	10.9		ug/Kg	☼	60	56 - 112
Endrin	0.36	U	18.1	12.0		ug/Kg	☼	66	64 - 125
Endrin aldehyde	0.42	U	18.1	11.5		ug/Kg	☼	64	45 - 101
Endrin ketone	0.45	U	18.2	12.0		ug/Kg	☼	66	59 - 115
gamma-BHC (Lindane)	0.52	U	18.1	12.0		ug/Kg	☼	66	61 - 113
Heptachlor	0.31	U	18.1	11.8		ug/Kg	☼	65	33 - 150
Heptachlor epoxide	0.51	U	18.1	14.3		ug/Kg	☼	79	60 - 114
Methoxychlor	0.90	U	18.1	13.6		ug/Kg	☼	75	58 - 130
trans-Chlordane	11	N	18.1	21.2	N	ug/Kg	☼	59	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*75*		*72 - 115*
Tetrachloro-m-xylene	*70*	*X*	*71 - 111*

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U	17.9	13.4		ug/Kg	☼	75	60 - 121	10	30
4,4'-DDE	0.91	U	17.9	14.9		ug/Kg	☼	83	63 - 111	11	30
4,4'-DDT	0.68	U	17.9	15.1		ug/Kg	☼	84	59 - 122	9	30
Aldrin	0.62	U	17.9	13.5		ug/Kg	☼	75	57 - 110	12	30
alpha-BHC	0.42	U	17.9	14.0		ug/Kg	☼	78	62 - 117	13	30
alpha-Chlordane	9.2	P	17.9	24.6		ug/Kg	☼	86	58 - 114	11	30
beta-BHC	0.50	U	17.9	13.2		ug/Kg	☼	74	61 - 108	10	30
delta-BHC	0.37	U	17.9	14.6		ug/Kg	☼	81	64 - 121	11	30
Dieldrin	0.23	U	17.9	14.3		ug/Kg	☼	80	57 - 114	11	30
Endosulfan I	0.62	U	17.9	13.5		ug/Kg	☼	75	31 - 89	11	30
Endosulfan II	0.32	U	17.9	13.3		ug/Kg	☼	74	40 - 93	10	30
Endosulfan sulfate	0.37	U	17.9	12.2		ug/Kg	☼	68	56 - 112	11	30
Endrin	0.36	U	17.9	13.4		ug/Kg	☼	75	64 - 125	10	30
Endrin aldehyde	0.42	U	17.9	12.9		ug/Kg	☼	72	45 - 101	11	30
Endrin ketone	0.45	U	17.9	13.6		ug/Kg	☼	76	59 - 115	12	30
gamma-BHC (Lindane)	0.52	U	17.9	13.6		ug/Kg	☼	76	61 - 113	12	30
Heptachlor	0.31	U	17.9	13.3		ug/Kg	☼	74	33 - 150	12	30
Heptachlor epoxide	0.51	U	17.9	15.9		ug/Kg	☼	89	60 - 114	10	30
Methoxychlor	0.90	U	17.9	15.2		ug/Kg	☼	85	58 - 130	11	30
trans-Chlordane	11	N	17.9	23.9		ug/Kg	☼	75	62 - 114	12	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		72 - 115
Tetrachloro-m-xylene	80		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403925/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1248	11	U	33	11	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1254	13	U	33	13	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1260	10	U	33	10	ug/Kg		12/03/18 13:56	12/05/18 19:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		23 - 146	12/03/18 13:56	12/05/18 19:08	1

Lab Sample ID: LCS 160-403925/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	149		ug/Kg		89	52 - 134
Aroclor 1260	167	157		ug/Kg		94	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	160		ug/Kg	☼	89	23 - 140
Aroclor 1260	11	U	180	162		ug/Kg	☼	90	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		23 - 146

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	182	144		ug/Kg	☼	79	23 - 140	10	30
Aroclor 1260	11	U	182	166		ug/Kg	☼	91	20 - 131	2	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32072-1
SDG: SL32072-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
LCS 160-404121/2-A	Lab Control Sample	77	75	75	73	73	80
MB 160-404121/1-A	Method Blank	67	74	75	63	69	77

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32072-1	B3KFF5	93	82
160-32072-1 MS	B3KFF5	75	70 X
160-32072-1 MSD	B3KFF5	87	80
160-32072-2	B3KFM3	71 X	73
160-32072-3	B3KFP7	95	86
160-32072-4	B3KFJ6	88	83
160-32072-5	B3KFK2	83	87
160-32072-6	B3KFJ9	77	77
160-32072-7	B3L195	88	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
LCS 160-403934/2-A	Lab Control Sample	94	92
MB 160-403934/1-A	Method Blank	89	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL32015-1, SL32017-1, SL32070-1, SL32072-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L192	11/26/18	Soil	C	8082A
B3KFH7	11/26/18	Soil	C	8082A
B3KFL7	11/26/18	Soil	C	8082A
B3KFJ3	11/26/18	Soil	C	8082A
B3KFN5	11/26/18	Soil	C	8082A
B3KFL1	11/26/18	Soil	C	8082A
B3KFM9	11/26/18	Soil	C	8082A
B3KFR3	11/26/18	Soil	C	8082A
B3KFN2	11/26/18	Soil	C	8082A
B3KFK8	11/26/18	Soil	C	8082A
B3KFR0	11/26/18	Soil	C	8082A
B3KFJ0	11/26/18	Soil	C	8082A
B3KFH4	11/26/18	Soil	C	8082A
B3KFF8	11/26/18	Soil	C	8082A
B3KFH1	11/26/18	Soil	C	8082A
B3KFP1	11/28/18	Soil	C	8082A
B3KFL4	11/28/18	Soil	C	8082A
B3KFM0	11/28/18	Soil	C	8082A
B3KFM6	11/28/18	Soil	C	8082A
B3KFK5	11/28/18	Soil	C	8082A
B3KFP4	11/28/18	Soil	C	8082A
B3KFF2	11/28/18	Soil	C	8082A
B3KFN8	11/28/18	Soil	C	8082A
B3KFF5	11/28/18	Soil	C	8082A
B3KFM3	11/28/18	Soil	C	8082A
B3KFP7	11/28/18	Soil	C	8082A
B3KFJ6	11/28/18	Soil	C	8082A
B3KFK2	11/28/18	Soil	C	8082A
B3KFJ9	11/28/18	Soil	C	8082A
B3L195	11/28/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S742077-PLAN-16, R0, Volume 1 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within 1 year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The CRDLs for aroclor 1016, aroclor 1254 and aroclor 1260 were met. CRDLs for other PCBs were not provided in the SAP.

- **Completeness**

SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL32015-1, SL32017-1, SL32070-1, SL32072-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL32015-1: B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1,					
SDG SL32017-1: B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1					
SDG SL32070-1 - B3KFP1, B3KFL4, B3KFM0, B3KFM6, B3KFK5, B3KFP4, B3KFF2, B3KFN8					
SDG SL32072-1 - B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs for acoclor 1016, aroclor 1254 and aroclor 1260 were met. No other CRDLs for PCBs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	89		72 - 115
Tetrachloro-m-xylene	83		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403415/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1248	11	U	33	11	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1254	13	U	33	13	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1260	10	U	33	10	ug/Kg		11/29/18 12:02	12/13/18 17:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	83		23 - 146	11/29/18 12:02	12/13/18 17:12	1

Lab Sample ID: LCS 160-403415/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	154		ug/Kg		93	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	166		ug/Kg	☼	92	23 - 140
Aroclor 1260	11	U	180	162		ug/Kg	☼	90	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	182	163		ug/Kg	☼	90	23 - 140	2	30
Aroclor 1260	11	U	182	159		ug/Kg	☼	87	20 - 131	2	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-403833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1

Lab Sample ID: LCS 160-403833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.59	8.82		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-403833/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.54	D	mg/Kg		82.5	53.5 - 124.5

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U D N	19.7	7.81	B D N	mg/Kg	☼	40	75 - 125
Lithium	5.7	B D	9.86	16.79	D	mg/Kg	☼	112	75 - 125

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U D N	19.4	8.02	B D N	mg/Kg	☼	41	75 - 125	3	30
Lithium	5.7	B D	9.69	16.28	D	mg/Kg	☼	109	75 - 125	3	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32015-16	B3KFL1	80	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-32015-11	B3L192	85
160-32015-11 MS	B3L192	86
160-32015-11 MSD	B3L192	81
160-32015-12	B3KFH7	79
160-32015-13	B3KFL7	79
160-32015-14	B3KFJ3	79
160-32015-15	B3KFN5	80
160-32015-16	B3KFL1	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-403415/2-A	Lab Control Sample	92
MB 160-403415/1-A	Method Blank	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403415/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1248	11	U	33	11	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1254	13	U	33	13	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1260	10	U	33	10	ug/Kg		11/29/18 12:02	12/13/18 17:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*83*		*23 - 146*	*11/29/18 12:02*	*12/13/18 17:12*	*1*

Lab Sample ID: LCS 160-403415/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	154		ug/Kg		93	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*23 - 146*

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	175	168		ug/Kg	☼	96	23 - 140
Aroclor 1260	10	U	175	165		ug/Kg	☼	94	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	175	150		ug/Kg	☼	85	23 - 140	11	30
Aroclor 1260	10	U	175	147		ug/Kg	☼	84	20 - 131	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*79*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**						
160-32017-3	B3KFM9	88						
160-32017-3 MS	B3KFM9	90						
160-32017-3 MSD	B3KFM9	79						
160-32017-4	B3KFR3	85						
160-32017-5	B3KFN2	86						
160-32017-6	B3KFK8	108						
160-32017-7	B3KFR0	83						
160-32017-8	B3KFJ0	81						
160-32017-9	B3KFH4	101						
160-32017-10	B3KFF8	90						
160-32017-11	B3KFH1	80						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**						
LCS 160-403415/2-A	Lab Control Sample	92						
MB 160-403415/1-A	Method Blank	83						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	95		72 - 115
Tetrachloro-m-xylene	86		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403925/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1248	11	U	33	11	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1254	13	U	33	13	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1260	10	U	33	10	ug/Kg		12/03/18 13:56	12/05/18 19:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		23 - 146	12/03/18 13:56	12/05/18 19:08	1

Lab Sample ID: LCS 160-403925/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	149		ug/Kg		89	52 - 134
Aroclor 1260	167	157		ug/Kg		94	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	177	159		ug/Kg	☼	90	23 - 140
Aroclor 1260	11	U	177	166		ug/Kg	☼	94	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	179	158		ug/Kg	☼	88	23 - 140	1	30
Aroclor 1260	11	U	179	164		ug/Kg	☼	92	20 - 131	1	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404213/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.8	2.2	mg/Kg		12/05/18 11:13	12/10/18 17:19	1
Lithium	1.3	U	4.4	1.3	mg/Kg		12/05/18 11:13	12/10/18 17:19	1

Lab Sample ID: LCS 160-404213/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.44	8.67		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-404213/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	72.24	D	mg/Kg		78.9	53.5 - 124.5

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.7	U N D	18.7	5.38	B N D	mg/Kg	☼	29	75 - 125
Lithium	4.6	B D	9.34	13.97	D	mg/Kg	☼	100	75 - 125

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.7	U N D	18.1	4.80	B D N	mg/Kg	☼	27	75 - 125	11	30
Lithium	4.6	B D	9.06	13.79	D	mg/Kg	☼	101	75 - 125	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32070-1
SDG: SL32070-1

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	**Client Sample ID**	**DCB2 (72-115)**	**TCX2 (71-111)**
LCS 160-403934/2-A	Lab Control Sample	94	92
MB 160-403934/1-A	Method Blank	89	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**
160-32070-13	B3KFP1	91
160-32070-13 MS	B3KFP1	92
160-32070-13 MSD	B3KFP1	91
160-32070-14	B3KFL4	91
160-32070-15	B3KFM0	89
160-32070-16	B3KFM6	87
160-32070-17	B3KFK5	79
160-32070-18	B3KFP4	84
160-32070-19	B3KFF2	84
160-32070-20	B3KFN8	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**
LCS 160-403925/2-A	Lab Control Sample	86
MB 160-403925/1-A	Method Blank	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		72 - 115
Tetrachloro-m-xylene	80		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403925/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1248	11	U	33	11	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1254	13	U	33	13	ug/Kg		12/03/18 13:56	12/05/18 19:08	1
Aroclor 1260	10	U	33	10	ug/Kg		12/03/18 13:56	12/05/18 19:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	90		23 - 146	12/03/18 13:56	12/05/18 19:08	1

Lab Sample ID: LCS 160-403925/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	149		ug/Kg		89	52 - 134
Aroclor 1260	167	157		ug/Kg		94	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	160		ug/Kg	☼	89	23 - 140
Aroclor 1260	11	U	180	162		ug/Kg	☼	90	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		23 - 146

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	182	144		ug/Kg	☼	79	23 - 140	10	30
Aroclor 1260	11	U	182	166		ug/Kg	☼	91	20 - 131	2	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404213/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.8	2.2	mg/Kg		12/05/18 11:13	12/10/18 17:19	1
Lithium	1.3	U	4.4	1.3	mg/Kg		12/05/18 11:13	12/10/18 17:19	1

Lab Sample ID: LCS 160-404213/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.44	8.67		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-404213/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	72.24	D	mg/Kg		78.9	53.5 - 124.5

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U N D	20.1	8.39	B N D	mg/Kg	☼	42	75 - 125
Lithium	6.2	B D	10.0	17.63	D	mg/Kg	☼	114	75 - 125

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U N D	19.6	7.97	B D N	mg/Kg	☼	41	75 - 125	5	30
Lithium	6.2	B D	9.81	16.51	D	mg/Kg	☼	105	75 - 125	7	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32072-1
SDG: SL32072-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
160-32072-1	B3KFF5	79							
160-32072-1 MS	B3KFF5	87							
160-32072-1 MSD	B3KFF5	88							
160-32072-2	B3KFM3	88							
160-32072-3	B3KFP7	91							
160-32072-4	B3KFJ6	87							
160-32072-5	B3KFK2	80							
160-32072-6	B3KFJ9	89							
160-32072-7	B3L195	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
LCS 160-403925/2-A	Lab Control Sample	86							
MB 160-403925/1-A	Method Blank	90							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL465551, GEL465631, GEL465731

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL465551, GEL465631 and GEL465731 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3KFF7	11/26/18	Soil	C	8151A
B3KFH0	11/26/18	Soil	C	8151A
B3KFH6	11/26/18	Soil	C	8151A
B3KFL6	11/26/18	Soil	C	8151A
B3KFH3	11/26/18	Soil	C	8151A
B3KFH9	11/26/18	Soil	C	8151A
B3KFJ2	11/26/18	Soil	C	8151A
B3KFK7	11/26/18	Soil	C	8151A
B3KFL0	11/26/18	Soil	C	8151A
B3KFM8	11/26/18	Soil	C	8151A
B3KFN1	11/26/18	Soil	C	8151A
B3KFN4	11/26/18	Soil	C	8151A
B3KFP9	11/26/18	Soil	C	8151A
B3KFR2	11/26/18	Soil	C	8151A
B3L191	11/26/18	Soil	C	8151A
B3KFL3	11/28/18	Soil	C	8151A
B3KFM2	11/28/18	Soil	C	8151A
B3KFF1	11/28/18	Soil	C	8151A
B3KFF4	11/28/18	Soil	C	8151A
B3KFN7	11/28/18	Soil	C	8151A
B3KFL9	11/28/18	Soil	C	8151A
B3KFK4	11/28/18	Soil	C	8151A
B3KFP6	11/28/18	Soil	C	8151A
B3KFK1	11/28/18	Soil	C	8151A
B3KFP3	11/28/18	Soil	C	8151A
B3KFJ5	11/28/18	Soil	C	8151A
B3KFJ8	11/28/18	Soil	C	8151A
B3L194	11/28/18	Soil	C	8151A
B3KFP0	11/28/18	Soil	C	8151A
B3KFM5	11/28/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL465551, the 2,4-dichlorophenylacetic acid surrogate recoveries for samples B3KFF7, B3KFH0, B3KFH6 and B3KFL6 on the confirmation column were above the upper acceptance limit. All sample results were non-detects and the results were reported from the primary column; therefore data should not be qualified.

For SDG GEL465631, the 2,4-dichlorophenylacetic acid surrogate recoveries for sample B3KFH3 on both columns, for samples B3L191 and B3KFH9 on the primary column and for samples B3KFL0, B3KFM8, B3KFP9 and B3KFR2 on the confirmation columns were above the upper acceptance limit. All results for these samples were non-detects and should not be qualified as a result.

For SDG GEL465731, the 2,4-dichlorophenylacetic acid surrogate recovery for sample B3KFM2 was below the lower acceptance limit but ≥10%. All sample results were non-detects and with the exception for dinoseb should be qualified as estimates and flagged "UJ." The dinoseb result was further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. The 2,4-dichlorophenylacetic acid for samples B3KFL3MS and B3KFL3MSD on the primary column were above the upper acceptance limit. Since samples were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG GEL465731
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of all affected samples.

The MS recovery for dalapon was below the lower acceptance limit but ≥20%. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

The MS and/or MSD recoveries for 2,4-D, dichlorprop and MCPP were above the upper acceptance limit. All sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG GEL465551, the LCS and/or LCSD recoveries for dalapon, dinoseb and MCPA were below the lower acceptance limit. All sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL465631, the LCS and/or LCSD recoveries for dalapon, dinoseb and MCPA were below the lower acceptance limit. All sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL465731, the LCS recoveries for dalapon, dinoseb and MCPA were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment all dalapon and MCPA sample results should be qualified as estimates and flagged "UJ." All dinoseb sample results were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

MS/MSD Samples

All MS/MSD RPDs were acceptable with the following exception.

For SDG GEL465731, the MS/MSD RPDs for 2,4-DB, dalapon, dinoseb and MCPA were above the upper acceptance limit. All sample results were non-detects, therefore all 2,4-DB, dalapon and MCPA sample results should be qualified as estimates and flagged "UJ." The dinoseb sample results were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected samples.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL465551, GEL465631 and GEL465731 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 95%.

MAJOR DEFICIENCIES

Major deficiency leading to qualification of dinoseb results as unusable was due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of the sample results as estimates were due to low matrix spike recovery, low surrogate recovery, low LCS recovery and poor MS/MSD precision. See the table in Appendix 2 for a listing of all affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticide & Herbicide Data Qualification Summary			
SDGs: GEL465551, GEL465631, GEL465731	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4,5-T, 2,4,5-TP, 2,4-D, Dicamba, Dichlorprop MCPP	UJ	B3KFM2	Low surrogate recovery
MCPA	UJ	B3KFM2	Low surrogate recovery, low LCS recovery and poor MS/MSD precision
2,4-DB	UJ	B3KFM2	Low surrogate recovery and poor MS/MSD precision
Dinoseb	UR	B3KFM2	Low surrogate recovery, very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
Dalapon	UJ	B3KFM2	Low surrogate recovery, low matrix spike recovery, low LCS recovery and poor MS/MSD precision
Dinoseb	UR	B3KFL3, B3KFF1, B3KFF4, B3KFN7, B3KFL9, B3KFK4, B3KFP6, B3KFK1, B3KFP3, B3KFJ5, B3KFJ8, B3L194, B3KFP0, B3KFM5	Very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
Dalapon	UJ	B3KFL3, B3KFF1, B3KFF4, B3KFN7, B3KFL9, B3KFK4, B3KFP6, B3KFK1, B3KFP3, B3KFJ5, B3KFJ8, B3L194, B3KFP0, B3KFM5	Low matrix spike recovery, low LCS recovery and poor MS/MSD precision
Dalapon,	UJ	B3KFF7, B3KFH0,	Low LCS recoveries.

Dinoseb, MCPA		B3KFH6, B3KFL6, B3KFH3, B3KFH9, B3KFJ2, B3KFK7, B3KFL0, B3KFM8, B3KFN1, B3KFN4, B3KFP9, B3KFR2, B3L191	
MCPA	UJ	B3KFL3, B3KFF1, B3KFF4, B3KFN7, B3KFL9, B3KFK4, B3KFP6, B3KFK1, B3KFP3, B3KFJ5, B3KFJ8, B3L194, B3KFP0, B3KFM5	Low LCS recoveries and poor MS/MSD precision
2,4-DB	UJ	B3KFL3, B3KFF1, B3KFF4, B3KFN7, B3KFL9, B3KFK4, B3KFP6, B3KFK1, B3KFP3, B3KFJ5, B3KFJ8, B3L194, B3KFP0, B3KFM5	Poor MS/MSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/16/19	
			SDG: GEL465551, GEL465631, GEL465731		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	

SAMPLES/MATRIX: Soil
SDG GEL465551 - B3KFF7, B3KFH0, B3KFH6, B3KFL6
SDG GEL465631 - B3KFH3, B3KFH9, B3KFJ2, B3KFK7, B3KFL0, B3KFM8, B3KFN1, B3KFN4, B3KFP9, B3KFR2, B3L191
SDG GEL465731 - B3KFL3, B3KFM2, B3KFF1, B3KFF4, B3KFN7, B3KFL9, B3KFK4, B3KFP6, B3KFK1, B3KFP3, B3KFJ5, B3KFJ8, B3L194, B3KFP0, B3KFM5

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SDG GEL465551 - DCAA2 B3KFF7 163%, B3KFH0 517%, B3KFH6 239%, B3KFL6 156%

SDG GEL465631 - DCAA1 B3KFH3 259%, B3KFH9 207%; B3L191 145%
DCAA2 B3KFH3 231%, B3KFL0 150%, B3KFM8 150%, B3KFP9 142%, B3KFR2 161%

SDG GEL465731 - DCAA1 B3KFL3MS 975%, B3KFL3MSD 841%, B3KFM2 49%

MS/MSD

No MS/MSD samples were analyzed with SDGs GEL465551 and GEL465631

SDG GEL465731 -MS/MSD 2,4-D 186%/223%, dichlorprop 135% (MS), dinoseb 18%/11%, MCPP 149%(MS)
dalapon 47% (MSD)

LCS/LCSD GEL465551 - dalapon 46%/44%, dinoseb 57%/66%, MCPA 66%(LCSD)

GEL465631 - dalapon 46%/44%, dinoseb 57%/66%, MCPA 66% (LCSD)

LCS GEL465731 - dalapon 48%, dinoseb 30%, MCPA 64%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG GEL465731 - MS/MSD RPD - 2,4-DB 41%, dalapon 45%, dinoseb 51%, MCPA 45%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL465551

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #		DCAA 2 %REC #	
1204173777	MB for batch 1828874	110		130	
1204173778	LCS for batch 1828874	111		113	
1204176070	LCSD for batch 1828874	99		99	
465551001	B3KFF7	115	D	163 *	D
465551002	B3KFH0	122	D	517 *	D
465551003	B3KFH6	115	D	239 *	D
465551004	B3KFL6	139	D	156 *	D

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465551**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828879										
QC1204173778 LCS										
2,4,5-T	39.9			35.9	ug/kg		90	(60%-139%)	LOF	12/07/18 18:46
2,4,5-TP	39.9			36.3	ug/kg		91	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			33.8	ug/kg		85	(51%-152%)		
Dalapon	399			184	ug/kg		46	(32%-110%)		
Dicamba	39.9			34.3	ug/kg		86	(53%-135%)		
Dichlorprop	39.9			33.6	ug/kg		84	(52%-136%)		
Dinoseb	39.9			22.9	ug/kg		57	(24%-104%)		
MCPA	3990			2870	ug/kg		72	(44%-142%)		
MCPP	3990			2880	ug/kg		72	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			111	ug/kg		111	(37%-149%)		
QC1204176070 LCSD										
2,4,5-T	40.0			33.2	ug/kg	8	83	(0%-30%)		12/07/18 19:15
2,4,5-TP	40.0			32.1	ug/kg	12	80	(0%-30%)		

QC Summary

Workorder: **465551**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828879										
2,4-D	40.0			31.3	ug/kg	8	78	(0%-30%)	LOF	12/07/18 19:15
2,4-DB	40.0			36.9	ug/kg	9	92	(0%-30%)		
Dalapon	400		P	177	ug/kg	4	44	(0%-30%)		
Dicamba	40.0			32.4	ug/kg	6	81	(0%-30%)		
Dichlorprop	40.0			30.1	ug/kg	11	75	(0%-30%)		
Dinoseb	40.0			26.4	ug/kg	14	66	(0%-30%)		
MCPA	4000			2650	ug/kg	8	66	(0%-30%)		
MCPP	4000			2830	ug/kg	2	71	(0%-30%)		
**2,4-Dichlorophenylacetic acid	100			98.7	ug/kg		99	(37%-149%)		
QC1204173777 MB										
2,4,5-T			U	1.65	ug/kg					12/07/18 18:18
2,4,5-TP			U	1.65	ug/kg					
2,4-D			U	1.65	ug/kg					
2,4-DB			U	1.65	ug/kg					
Dalapon			U	34.7	ug/kg					
Dicamba			U	1.99	ug/kg					

QC Summary

Workorder: **465551**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828879											
Dichlorprop			U	2.24	ug/kg				LOF	12/07/18	18:18
Dinoseb			U	1.65	ug/kg						
MCPA			U	228	ug/kg						
MCPP			U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.3			110	ug/kg		110	(37%-149%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL465631

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC	#	DCAA 2 %REC	#
1204173777	MB for batch 1828874	110		130	
1204173778	LCS for batch 1828874	111		113	
1204176070	LCSD for batch 1828874	99		99	
465631001	B3KFH3	259 *	D	231 *	D
465631002	B3KFH9	207 *	D	122	D
465631003	B3KFJ2	135	D	140	D
465631004	B3KFK7	82	D	134	D
465631005	B3KFL0	90	D	150 *	D
465631006	B3KFM8	110	D	150 *	D
465631007	B3KFN1	94	D	137	D
465631008	B3KFN4	92	D	127	D
465631009	B3KFP9	123	D	142	D
465631010	B3KFR2	126	D	161 *	D
465631011	B3L191	145	D	118	D

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465631**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828879										
QC1204173778 LCS										
2,4,5-T	39.9			35.9	ug/kg		90	(60%-139%)	LOF	12/07/18 18:46
2,4,5-TP	39.9			36.3	ug/kg		91	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			33.8	ug/kg		85	(51%-152%)		
Dalapon	399			184	ug/kg		46	(32%-110%)		
Dicamba	39.9			34.3	ug/kg		86	(53%-135%)		
Dichlorprop	39.9			33.6	ug/kg		84	(52%-136%)		
Dinoseb	39.9			22.9	ug/kg		57	(24%-104%)		
MCPA	3990			2870	ug/kg		72	(44%-142%)		
MCPP	3990			2880	ug/kg		72	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			111	ug/kg		111	(37%-149%)		
QC1204176070 LCSD										
2,4,5-T	40.0			33.2	ug/kg	8	83	(0%-30%)		12/07/18 19:15
2,4,5-TP	40.0			32.1	ug/kg	12	80	(0%-30%)		

QC Summary

Workorder: **465631**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828879											
2,4-D	40.0			31.3	ug/kg	8	78	(0%-30%)	LOF	12/07/18	19:15
2,4-DB	40.0			36.9	ug/kg	9	92	(0%-30%)			
Dalapon	400		P	177	ug/kg	4	44	(0%-30%)			
Dicamba	40.0			32.4	ug/kg	6	81	(0%-30%)			
Dichlorprop	40.0			30.1	ug/kg	11	75	(0%-30%)			
Dinoseb	40.0			26.4	ug/kg	14	66	(0%-30%)			
MCPA	4000			2650	ug/kg	8	66	(0%-30%)			
MCPP	4000			2830	ug/kg	2	71	(0%-30%)			
**2,4-Dichlorophenylacetic acid	100			98.7	ug/kg		99	(37%-149%)			
QC1204173777 MB											
2,4,5-T			U	1.65	ug/kg					12/07/18	18:18
2,4,5-TP			U	1.65	ug/kg						
2,4-D			U	1.65	ug/kg						
2,4-DB			U	1.65	ug/kg						
Dalapon			U	34.7	ug/kg						
Dicamba			U	1.99	ug/kg						

QC Summary

Workorder: **465631**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828879											
Dichlorprop			U	2.24	ug/kg				LOF	12/07/18	18:18
Dinoseb			U	1.65	ug/kg						
MCPA			U	228	ug/kg						
MCPP			U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.3			110	ug/kg		110	(37%-149%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL465731

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204174924	MB for batch 1829402	98	108
1204174925	LCS for batch 1829402	106	102
465731016	B3KFL3	80	103
1204174926	B3KFL3MS	975 *	143
1204174927	B3KFL3MSD	841 *	124
465731017	B3KFM2	49	63
465731018	B3KFF1	67	87
465731019	B3KFF4	65	92
465731020	B3KFN7	86	106
465731021	B3KFL9	75	100
465731022	B3KFK4	75	93
465731023	B3KFP6	82	105
465731024	B3KFK1	95	107
465731025	B3KFP3	82	106
465731026	B3KFJ5	120	108
465731027	B3KFJ8	87	106
465731028	B3L194	90	102
465731029	B3KFP0	81	102
465731030	B3KFM5	82	102

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465731**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1829404											
QC1204174925 LCS											
2,4,5-T	40.0			37.0	ug/kg		93	(60%-139%)	LOF	12/12/18	16:12
2,4,5-TP	40.0			36.9	ug/kg		92	(62%-140%)			
2,4-D	40.0			33.3	ug/kg		83	(55%-140%)			
2,4-DB	40.0			35.3	ug/kg		88	(51%-152%)			
Dalapon	400			192	ug/kg		48	(32%-110%)			
Dicamba	40.0			33.7	ug/kg		84	(53%-135%)			
Dichlorprop	40.0			32.9	ug/kg		82	(52%-136%)			
Dinoseb	40.0			12.1	ug/kg		30	(24%-104%)			
MCPA	4000			2550	ug/kg		64	(44%-142%)			
MCPP	4000			2950	ug/kg		74	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			102	ug/kg		102	(37%-149%)			
QC1204174924 MB											
2,4,5-T			U	1.66	ug/kg					12/12/18	15:44
2,4,5-TP			U	1.66	ug/kg						

GEL LABORATORIES LLC

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QC Summary

Workorder: **465731**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1829404												
2,4-D				U	1.66	ug/kg				LOF	12/12/18	15:44
2,4-DB				U	1.66	ug/kg						
Dalapon				U	35.0	ug/kg						
Dicamba				U	2.00	ug/kg						
Dichlorprop				U	2.26	ug/kg						
Dinoseb				U	1.66	ug/kg						
MCPA				U	230	ug/kg						
MCPP				U	200	ug/kg						
**2,4-Dichlorophenylacetic acid	100				97.6	ug/kg		98	(37%-149%)			
QC1204174926 465731016 MS												
2,4,5-T	42.5	U	1.77		38.8	ug/kg		91	(39%-144%)		12/12/18	17:09
2,4,5-TP	42.5	U	1.77		38.5	ug/kg		91	(40%-146%)			
2,4-D	42.5	TU	1.77	PT	79.1	ug/kg		186*	(40%-149%)			
2,4-DB	42.5	U	1.77		47.0	ug/kg		110	(29%-160%)			
Dalapon	425	U	37.3		316	ug/kg		74	(19%-132%)			
Dicamba	42.5	U	2.13	P	41.4	ug/kg		97	(46%-135%)			

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QC Summary

Workorder: **465731**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1829404											
Dichlorprop	42.5	U	2.41		57.4	ug/kg		135	(38%-145%)	LOF	12/12/18 17:09
Dinoseb	42.5	TU	1.77	T	7.72	ug/kg		18*	(20%-118%)		
MCPA	4250	U	245	P	5290	ug/kg		125	(29%-154%)		
MCPP	4250	TU	213	T	6340	ug/kg		149*	(30%-135%)		
**2,4-Dichlorophenylacetic acid	106		85.4		1040	ug/kg		975*	(37%-149%)		
QC1204174927 465731016 MSD											
2,4,5-T	42.5	U	1.77		36.3	ug/kg	7	85	(0%-30%)		12/12/18 17:37
2,4,5-TP	42.5	U	1.77		36.4	ug/kg	5	86	(0%-30%)		
2,4-D	42.5	TU	1.77	EPT	94.7	ug/kg	18	223*	(0%-30%)		
2,4-DB	42.5	U	1.77		30.9	ug/kg	41*	73	(0%-30%)		
Dalapon	425	U	37.3		199	ug/kg	45*	47	(0%-30%)		
Dicamba	42.5	U	2.13	P	39.3	ug/kg	5	92	(0%-30%)		
Dichlorprop	42.5	U	2.41	P	52.9	ug/kg	8	124	(0%-30%)		
Dinoseb	42.5	TU	1.77	JT	4.60	ug/kg	51*	11*	(0%-30%)		
MCPA	4250	U	245	P	3360	ug/kg	45*	79	(0%-30%)		
MCPP	4250	TU	213		5290	ug/kg	18	124	(0%-30%)		

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **465731**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1829404											
**2,4-Dichlorophenylacetic acid	106	85.4		894	ug/kg		841*	(37%-149%)	LOF	12/12/18	17:37

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Groups (SDGs) SL32015-1, SL32017-1, SL32070-1, SL32072-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L192	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFH7	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFL7	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFJ3	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFN5	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFL1	11/26/18	Soil	C	6010D, 6020B, 7471B
B3LFM9	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFR3	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFN2	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFK8	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFR0	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFJ0	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFH4	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFF8	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFH1	11/26/18	Soil	C	6010D, 6020B, 7471B
B3KFP1	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFL4	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFM0	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFM6	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFK5	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFP4	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFF2	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFN8	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFF5	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFM3	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFP7	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFJ6	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFK2	11/28/18	Soil	C	6010D, 6020B, 7471B
B3KFJ9	11/28/18	Soil	C	6010D, 6020B, 7471B
B3L195	11/28/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG SL32015-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detect and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for Al, Mn and Ba were above the upper acceptance limit. All associated sample results were detects, therefore all Ba sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected sample results. The parent sample results for Al and Mn were >4X the spike concentration; therefore data should not be qualified.

SDG SL32017-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit. All associated Al and Mn sample results were detects; therefore all Mn sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected sample. The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified.

SDG SL32070-1
The MS and MSD recoveries for B were <30%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit. All associated Al and Mn sample results were detects; therefore, all Mn sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected samples. The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified.

SDG SL32072-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit. All associated Al and Mn sample results were detects; therefore all Mn sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected sample. The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable with the following exception.
The Cr RPD for samples B3KFR0 and B3L192 was 56%

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard

results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

- **Completeness**

SDGs SL32015-1, SL32017-1, SL32070-1 and SL32072-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 99%.

MAJOR DEFICIENCIES

A major deficiency leading to qualification of B results as unusable was due to a very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to a matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Metals Data Qualification Summary			
SDGs: SL32015-1, SL32017-1, SL32070-1, SL32072-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
B	UJ	B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1, B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1, B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195	Low matrix spike recoveries
Ba	J+	B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1	High matrix spike recoveries
Mn	J+	B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1, B3KFP1, B3KFL4, B3KFM0, B3KFM6, B3KFK5, B3KFP4, B3KFF2, B3KFN8, B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195	High matrix spike recoveries
B	UR	B3KFP1, B3KFL4, B3KFM0, B3KFM6, B3KFK5, B3KFP4, B3KFF2, B3KFN8	Very low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-012		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL32015-1, SL32017-1, SL32070-1, SL32072-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SDG SL32015-1 - B3L192, B3KFH7, B3KFL7, B3KFJ3, B3KFN5, B3KFL1					
SDG SL32017-1 - B3KFM9, B3KFR3, B3KFN2, B3KFK8, B3KFR0, B3KFJ0, B3KFH4, B3KFF8, B3KFH1					
SDG SL32070-1 - B3KFP1, B3KFL4, B3KFM0, B3KFM6, B3KFK5, B3KFP4, B3KFF2, B3KFN8					
SDG SL32072-1 - B3KFF5, B3KFM3, B3KFP7, B3KFJ6, B3KFK2, B3KFJ9, B3L195					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
ICP interference checks acceptable?	Yes No N/A
ICV and CCV checks performed on all instruments?	Yes No N/A
ICV and CCV checks acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No N/A
ICB and CCB results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field blanks analyzed? (Levels C, D, E)	Yes No N/A
Field blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL32015-1 - B 40%/41%; Al 234%/236%; Mn 135%/281%, Ba 153%(MSD) (Al & Mn parent >4X spike)

SDG SL32017-1 - B 39%/36%, Al 234%/206%, Mn 169%/152% (Al parent >4X spike)

SDG SL32070-1 - B 29%/27%, Al 183%/221%, Mn 221%/201% (Al parent >4X spike)

SDG SL32072-1 - B 42%/41%, Al 267%/310%, Mn 131%/147% (Al parent >4X spike)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Sample B3KFR0/B3L192 - Cr 56%

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No N/A
ICP serial dilution %D values acceptable?	Yes No N/A
ICP post digestion spike required?	Yes No N/A
ICP post digestion spike values acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided in the SAP.

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-403833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1

Lab Sample ID: LCS 160-403833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.59	8.82		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-403833/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.54	D	mg/Kg		82.5	53.5 - 124.5

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U D N	19.7	7.81	B D N	mg/Kg	☼	40	75 - 125
Lithium	5.7	B D	9.86	16.79	D	mg/Kg	☼	112	75 - 125

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U D N	19.4	8.02	B D N	mg/Kg	☼	41	75 - 125	3	30
Lithium	5.7	B D	9.69	16.28	D	mg/Kg	☼	109	75 - 125	3	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-403830/1-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403830

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Arsenic	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Copper	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Lead	0.12	U D	0.29	0.12	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Tin	0.088	U D	0.20	0.088	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2

Lab Sample ID: LCS 160-403830/2-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	85.9	89.76	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-403830/3-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9050	8674	D	mg/Kg		95.9	50.2 - 149.5
Arsenic	174	188.5	D	mg/Kg		108.2	70.2 - 129.8
Barium	281	283.7	D	mg/Kg		100.8	75.0 - 125.0
Beryllium	106	108.7	D	mg/Kg		102.9	75.0 - 125.0
Cadmium	228	223.5	D	mg/Kg		97.9	74.9 - 125.1
Chromium	147	156.7	D	mg/Kg		106.5	70.0 - 130.1
Cobalt	52.2	57.28	D	mg/Kg		109.8	74.9 - 124.9
Copper	180	198.7	D	mg/Kg		110.6	74.7 - 124.7
Lead	120	121.7	D	mg/Kg		101.3	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-403830/3-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	312	265.4	D	mg/Kg		85.1	57.3 - 101.0
Molybdenum	119	120.8	D	mg/Kg		101.4	70.5 - 129.1
Nickel	99.5	109.6	D	mg/Kg		110.2	70.0 - 129.5
Selenium	207	227.4	D	mg/Kg		110.0	68.6 - 131.9
Silver	46.9	48.29	D	mg/Kg		103.0	69.5 - 130.5
Strontium	116	115.4	D	mg/Kg		99.7	72.1 - 128.0
Tin	108	108.5	D	mg/Kg		100.3	56.8 - 143.1
Vanadium	61.4	66.28	D	mg/Kg		108.0	56.8 - 143.4
Zinc	215	227.1	D	mg/Kg		105.4	69.8 - 130.2

Lab Sample ID: 160-32015-11 MS
Matrix: Soil
Analysis Batch: 404957

Client Sample ID: B3L192
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6850	D	986	9165	X D	mg/Kg	☼	234	75 - 125
Arsenic	2.4	D	98.6	96.26	D	mg/Kg	☼	95	75 - 125
Barium	78.4	N D	98.6	195.7	D	mg/Kg	☼	119	75 - 125
Beryllium	0.33	D	9.86	11.06	D	mg/Kg	☼	109	75 - 125
Cadmium	0.089	D	98.6	102.3	D	mg/Kg	☼	104	75 - 125
Chromium	7.4	D	98.6	94.93	D	mg/Kg	☼	89	75 - 125
Cobalt	11.3	D	98.6	108.1	D	mg/Kg	☼	98	75 - 125
Copper	18.1	D	98.6	113.9	D	mg/Kg	☼	97	75 - 125
Lead	4.0	D	98.6	105.4	D	mg/Kg	☼	103	75 - 125
Manganese	406	D	98.6	539.2	X D	mg/Kg	☼	135	75 - 125
Molybdenum	0.43	B D	49.3	49.80	D	mg/Kg	☼	100	75 - 125
Nickel	11.6	D	98.6	110.2	D	mg/Kg	☼	100	75 - 125
Selenium	2.1	D	49.3	45.06	D	mg/Kg	☼	87	75 - 125
Silver	0.074	U D	19.7	21.01	D	mg/Kg	☼	106	75 - 125
Strontium	29.9	D	98.6	132.0	D	mg/Kg	☼	103	75 - 125
Tin	0.56	D	98.6	102.8	D	mg/Kg	☼	104	75 - 125
Uranium	0.50	D	98.6	104.8	D	mg/Kg	☼	106	75 - 125
Vanadium	75.2	D	98.6	164.8	D	mg/Kg	☼	91	75 - 125
Zinc	52.0	D	98.6	142.8	D	mg/Kg	☼	92	75 - 125

Lab Sample ID: 160-32015-11 MSD
Matrix: Soil
Analysis Batch: 404957

Client Sample ID: B3L192
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6850	D	969	9138	X D	mg/Kg	☼	236	75 - 125	0	30
Arsenic	2.4	D	96.9	96.32	D	mg/Kg	☼	97	75 - 125	0	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	78.4	N D	96.9	226.9	N D	mg/Kg	☼	153	75 - 125	15	30
Beryllium	0.33	D	9.69	10.60	D	mg/Kg	☼	106	75 - 125	4	30
Cadmium	0.089	D	96.9	96.19	D	mg/Kg	☼	99	75 - 125	6	30
Chromium	7.4	D	96.9	95.40	D	mg/Kg	☼	91	75 - 125	0	30
Cobalt	11.3	D	96.9	109.5	D	mg/Kg	☼	101	75 - 125	1	30
Copper	18.1	D	96.9	116.2	D	mg/Kg	☼	101	75 - 125	2	30
Lead	4.0	D	96.9	100.6	D	mg/Kg	☼	100	75 - 125	5	30
Manganese	406	D	96.9	678.8	X D	mg/Kg	☼	281	75 - 125	23	30
Molybdenum	0.43	B D	48.5	47.74	D	mg/Kg	☼	98	75 - 125	4	30
Nickel	11.6	D	96.9	108.3	D	mg/Kg	☼	100	75 - 125	2	30
Selenium	2.1	D	48.5	45.74	D	mg/Kg	☼	90	75 - 125	2	30
Silver	0.074	U D	19.4	19.84	D	mg/Kg	☼	102	75 - 125	6	30
Strontium	29.9	D	96.9	122.4	D	mg/Kg	☼	95	75 - 125	7	30
Tin	0.56	D	96.9	99.80	D	mg/Kg	☼	102	75 - 125	3	30
Uranium	0.50	D	96.9	98.42	D	mg/Kg	☼	101	75 - 125	6	30
Vanadium	75.2	D	96.9	169.5	D	mg/Kg	☼	97	75 - 125	3	30
Zinc	52.0	D	96.9	144.8	D	mg/Kg	☼	96	75 - 125	1	30

Lab Sample ID: MB 160-403835/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.18	U D	0.46	0.18	mg/Kg		12/03/18 09:26	12/13/18 00:50	2

Lab Sample ID: LCS 160-403835/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.2	41.50	D	mg/Kg		98	21 - 251

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.46	U D	49.8	57.87	D	mg/Kg	☼	116	75 - 125

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.46	U D	49.4	51.03	D	mg/Kg	☼	103	75 - 125	13	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32015-1
SDG: SL32015-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-404464/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.035	0.012	mg/Kg		12/06/18 12:55	12/07/18 12:38	1

Lab Sample ID: LCSSRM 160-404464/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	10.89	D	mg/Kg		94.7	59.7 - 139.1		

Lab Sample ID: 160-32015-11 MS — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.014	U	0.959	0.987		mg/Kg	☼	103	80 - 120		

Lab Sample ID: 160-32015-11 MSD — **Client Sample ID: B3L192**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.014	U	0.967	1.04		mg/Kg	☼	107	80 - 120	5	30

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-403833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1

Lab Sample ID: LCS 160-403833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.59	8.82		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-403833/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.54	D	mg/Kg		82.5	53.5 - 124.5

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U D N	19.0	7.36	B D N	mg/Kg	☼	39	75 - 125
Lithium	5.4	B D	9.49	14.95	D	mg/Kg	☼	100	75 - 125

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U D N	18.1	6.50	B D N	mg/Kg	☼	36	75 - 125	12	30
Lithium	5.4	B D	9.03	14.19	D	mg/Kg	☼	97	75 - 125	5	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-403830/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Arsenic	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Copper	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-403830/1-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403830

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.12	U D	0.29	0.12	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Tin	0.088	U D	0.20	0.088	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2

Lab Sample ID: LCS 160-403830/2-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	85.9	89.76	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-403830/3-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9050	8674	D	mg/Kg		95.9	50.2 - 149.5
Arsenic	174	188.5	D	mg/Kg		108.2	70.2 - 129.8
Barium	281	283.7	D	mg/Kg		100.8	75.0 - 125.0
Beryllium	106	108.7	D	mg/Kg		102.9	75.0 - 125.0
Cadmium	228	223.5	D	mg/Kg		97.9	74.9 - 125.1
Chromium	147	156.7	D	mg/Kg		106.5	70.0 - 130.1
Cobalt	52.2	57.28	D	mg/Kg		109.8	74.9 - 124.9
Copper	180	198.7	D	mg/Kg		110.6	74.7 - 124.7
Lead	120	121.7	D	mg/Kg		101.3	71.0 - 128.8
Manganese	312	265.4	D	mg/Kg		85.1	57.3 - 101.0
Molybdenum	119	120.8	D	mg/Kg		101.4	70.5 - 129.1
Nickel	99.5	109.6	D	mg/Kg		110.2	70.0 - 129.5
Selenium	207	227.4	D	mg/Kg		110.0	68.6 - 131.9
Silver	46.9	48.29	D	mg/Kg		103.0	69.5 - 130.5

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-403830/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Strontium	116	115.4	D	mg/Kg		99.7	72.1 - 128.0
Tin	108	108.5	D	mg/Kg		100.3	56.8 - 143.1
Vanadium	61.4	66.28	D	mg/Kg		108.0	56.8 - 143.4
Zinc	215	227.1	D	mg/Kg		105.4	69.8 - 130.2

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5370	D	949	7596	D X	mg/Kg	☼	234	75 - 125
Arsenic	1.7	D	94.9	95.29	D	mg/Kg	☼	99	75 - 125
Barium	71.7	D	94.9	164.9	D	mg/Kg	☼	98	75 - 125
Beryllium	0.28	D	9.49	10.08	D	mg/Kg	☼	103	75 - 125
Cadmium	0.10	D	94.9	93.48	D	mg/Kg	☼	98	75 - 125
Chromium	6.2	D	94.9	93.81	D	mg/Kg	☼	92	75 - 125
Cobalt	10.7	D	94.9	107.1	D	mg/Kg	☼	102	75 - 125
Copper	16.1	D	94.9	112.4	D	mg/Kg	☼	101	75 - 125
Lead	3.5	D	94.9	97.59	D	mg/Kg	☼	99	75 - 125
Manganese	369	D N	94.9	529.2	D N	mg/Kg	☼	169	75 - 125
Molybdenum	0.44	B D	47.4	46.82	D	mg/Kg	☼	98	75 - 125
Nickel	9.4	D	94.9	104.9	D	mg/Kg	☼	101	75 - 125
Selenium	2.0	D	47.4	45.40	D	mg/Kg	☼	91	75 - 125
Silver	0.074	U D	19.0	18.88	D	mg/Kg	☼	99	75 - 125
Strontium	21.3	D	94.9	118.6	D	mg/Kg	☼	103	75 - 125
Tin	0.52	D	94.9	94.00	D	mg/Kg	☼	99	75 - 125
Uranium	0.43	D	94.9	96.29	D	mg/Kg	☼	101	75 - 125
Zinc	54.3	D	94.9	146.6	D	mg/Kg	☼	97	75 - 125

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vanadium	84.8	D	94.9	164.5	D	mg/Kg	☼	84	75 - 125

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5370	D	903	7234	D X	mg/Kg	☼	206	75 - 125	5	30
Arsenic	1.7	D	90.3	91.31	D	mg/Kg	☼	99	75 - 125	4	30
Barium	71.7	D	90.3	169.2	D	mg/Kg	☼	108	75 - 125	3	30
Beryllium	0.28	D	9.03	10.21	D	mg/Kg	☼	110	75 - 125	1	30
Cadmium	0.10	D	90.3	95.26	D	mg/Kg	☼	105	75 - 125	2	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	6.2	D	90.3	90.13	D	mg/Kg	☼	93	75 - 125	4	30
Cobalt	10.7	D	90.3	104.1	D	mg/Kg	☼	103	75 - 125	3	30
Copper	16.1	D	90.3	110.1	D	mg/Kg	☼	104	75 - 125	2	30
Lead	3.5	D	90.3	100.7	D	mg/Kg	☼	108	75 - 125	3	30
Manganese	369	D N	90.3	506.1	D X	mg/Kg	☼	152	75 - 125	4	30
Molybdenum	0.44	B D	45.1	47.60	D	mg/Kg	☼	104	75 - 125	2	30
Nickel	9.4	D	90.3	101.5	D	mg/Kg	☼	102	75 - 125	3	30
Selenium	2.0	D	45.1	43.08	D	mg/Kg	☼	91	75 - 125	5	30
Silver	0.074	U D	18.1	19.28	D	mg/Kg	☼	107	75 - 125	2	30
Strontium	21.3	D	90.3	120.1	D	mg/Kg	☼	109	75 - 125	1	30
Tin	0.52	D	90.3	94.78	D	mg/Kg	☼	104	75 - 125	1	30
Uranium	0.43	D	90.3	98.01	D	mg/Kg	☼	108	75 - 125	2	30
Zinc	54.3	D	90.3	142.1	D	mg/Kg	☼	97	75 - 125	3	30

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vanadium	84.8	D	90.3	169.5	D	mg/Kg	☼	94	75 - 125	3	30

Lab Sample ID: MB 160-403835/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.18	U D	0.46	0.18	mg/Kg		12/03/18 09:26	12/13/18 00:50	2

Lab Sample ID: LCS 160-403835/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.2	41.50	D	mg/Kg		98	21 - 251

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.47	U D	51.0	53.92	D	mg/Kg	☼	106	75 - 125

Lab Sample ID: 160-32017-3 MSD — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.47	U D	48.4	50.65	D	mg/Kg	☼	105	75 - 125	6	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-404464/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.035	0.012	mg/Kg		12/06/18 12:55	12/07/18 12:38	1

Lab Sample ID: LCSSRM 160-404464/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.89	D	mg/Kg		94.7	59.7 - 139.1

Lab Sample ID: 160-32017-6 MS — **Client Sample ID: B3KFK8**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	0.949	1.02		mg/Kg	☼	108	80 - 120

Lab Sample ID: 160-32017-6 MSD — **Client Sample ID: B3KFK8**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	0.999	1.04		mg/Kg	☼	104	80 - 120	2	30

Lab Sample ID: MB 160-404471/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		12/06/18 13:34	12/07/18 13:31	1

Lab Sample ID: LCSSRM 160-404471/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.89	D	mg/Kg		94.7	59.7 - 139.1

Lab Sample ID: 160-32017-3 MS — **Client Sample ID: B3KFM9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.012	U	1.00	1.12		mg/Kg	☼	112	80 - 120

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-1
SDG: SL32017-1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: 160-32017-3 MSD
Matrix: Soil
Analysis Batch: 404789

Client Sample ID: B3KFM9
Prep Type: Total/NA
Prep Batch: 404471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.012	U	1.03	1.12		mg/Kg	☼	110	80 - 120	0	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	91		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404213/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.8	2.2	mg/Kg		12/05/18 11:13	12/10/18 17:19	1
Lithium	1.3	U	4.4	1.3	mg/Kg		12/05/18 11:13	12/10/18 17:19	1

Lab Sample ID: LCS 160-404213/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.44	8.67		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-404213/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	72.24	D	mg/Kg		78.9	53.5 - 124.5

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.7	U N D	18.7	5.38	B N D	mg/Kg	☼	29	75 - 125
Lithium	4.6	B D	9.34	13.97	D	mg/Kg	☼	100	75 - 125

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.7	U N D	18.1	4.80	B D N	mg/Kg	☼	27	75 - 125	11	30
Lithium	4.6	B D	9.06	13.79	D	mg/Kg	☼	101	75 - 125	1	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-404210/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.47	0.19	mg/Kg		12/05/18 11:05	12/13/18 13:56	2

Lab Sample ID: LCS 160-404210/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	45.3	46.14	D	mg/Kg		102	21 - 251

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.49	U D	45.2	44.22	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.49	U D	48.5	47.17	D	mg/Kg	☼	97	75 - 125	6	30

Lab Sample ID: MB 160-404212/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405766 — **Prep Batch: 404212**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.8	U D	4.4	1.8	mg/Kg		12/05/18 11:10	12/13/18 20:44	2

Lab Sample ID: MB 160-404212/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406071 — **Prep Batch: 404212**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Barium	0.44	U D	1.8	0.44	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Beryllium	0.035	U D	0.088	0.035	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Cadmium	0.021	U D	0.044	0.021	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Chromium	0.40	U D	0.88	0.40	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Cobalt	0.066	U D	0.18	0.066	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Copper	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Lead	0.11	U D	0.27	0.11	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Manganese	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Molybdenum	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Nickel	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Selenium	0.28	U D	0.44	0.28	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Silver	0.066	U D	0.18	0.066	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Strontium	0.21	U D	0.44	0.21	mg/Kg		12/05/18 11:10	12/14/18 22:16	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-404212/1-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404212

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.080	U D	0.18	0.080	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Uranium	0.035	U D	0.088	0.035	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Vanadium	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Zinc	1.8	U D	4.4	1.8	mg/Kg		12/05/18 11:10	12/14/18 22:16	2

Lab Sample ID: LCS 160-404212/2-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.4	89.41	D	mg/Kg		106	80 - 120

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 405766

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7307	D	mg/Kg		87.4	50.2 - 149.5

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	161	162.8	D	mg/Kg		101.1	70.2 - 129.8
Barium	260	266.1	D	mg/Kg		102.3	75.0 - 125.0
Beryllium	97.6	102.1	D	mg/Kg		104.6	75.0 - 125.0
Cadmium	211	219.8	D	mg/Kg		104.2	74.9 - 125.1
Chromium	136	128.6	D	mg/Kg		94.6	70.0 - 130.1
Cobalt	48.2	50.79	D	mg/Kg		105.4	74.9 - 124.9
Copper	166	173.4	D	mg/Kg		104.5	74.7 - 124.7
Lead	111	112.9	D	mg/Kg		101.8	71.0 - 128.8
Manganese	288	231.4	D	mg/Kg		80.4	57.3 - 101.0
Molybdenum	110	116.1	D	mg/Kg		105.5	70.5 - 129.1
Nickel	91.9	96.82	D	mg/Kg		105.3	70.0 - 129.5
Selenium	191	205.8	D	mg/Kg		107.7	68.6 - 131.9
Silver	43.3	43.59	D	mg/Kg		100.7	69.5 - 130.5
Strontium	107	121.3	D	mg/Kg		113.3	72.1 - 128.0

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	99.22	D	mg/Kg		99.3	56.8 - 143.1
Vanadium	56.7	52.09	D	mg/Kg		91.9	56.8 - 143.4
Zinc	199	206.7	D	mg/Kg		103.9	69.8 - 130.2

Lab Sample ID: 160-32070-13 MS
Matrix: Soil
Analysis Batch: 405766

Client Sample ID: B3KFP1
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5520	D	934	7232	X D	mg/Kg	☼	183	75 - 125

Lab Sample ID: 160-32070-13 MS
Matrix: Soil
Analysis Batch: 406071

Client Sample ID: B3KFP1
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.1	D	93.4	91.12	D	mg/Kg	☼	95	75 - 125
Barium	63.8	D	93.4	156.9	D	mg/Kg	☼	100	75 - 125
Beryllium	0.28	D	9.34	9.86	D	mg/Kg	☼	103	75 - 125
Cadmium	0.084	D	93.4	89.88	D	mg/Kg	☼	96	75 - 125
Chromium	5.9	D	93.4	84.08	D	mg/Kg	☼	84	75 - 125
Cobalt	11.7	D	93.4	105.0	D	mg/Kg	☼	100	75 - 125
Copper	17.9	D	93.4	109.7	D	mg/Kg	☼	98	75 - 125
Lead	3.2	D	93.4	93.42	D	mg/Kg	☼	97	75 - 125
Manganese	364	D N	93.4	570.4	D N	mg/Kg	☼	221	75 - 125
Molybdenum	0.48	D	46.7	46.66	D	mg/Kg	☼	99	75 - 125
Nickel	11.4	D	93.4	103.4	D	mg/Kg	☼	98	75 - 125
Selenium	2.3	D	46.7	44.07	D	mg/Kg	☼	90	75 - 125
Silver	0.070	U D	18.7	17.84	D	mg/Kg	☼	95	75 - 125
Strontium	21.9	D	93.4	123.2	D	mg/Kg	☼	108	75 - 125
Tin	0.55	D	93.4	91.06	D	mg/Kg	☼	97	75 - 125
Uranium	0.44	D	93.4	92.91	D	mg/Kg	☼	99	75 - 125
Vanadium	75.4	D	93.4	159.3	D	mg/Kg	☼	90	75 - 125
Zinc	53.1	D	93.4	144.9	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-32070-13 MSD
Matrix: Soil
Analysis Batch: 405766

Client Sample ID: B3KFP1
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5520	D	906	7524	X D	mg/Kg	☼	221	75 - 125	4	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406071 — **Prep Batch: 404212**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	2.1	D	90.6	91.27	D	mg/Kg	☼	98	75 - 125	0	30
Barium	63.8	D	90.6	154.5	D	mg/Kg	☼	100	75 - 125	2	30
Beryllium	0.28	D	9.06	9.71	D	mg/Kg	☼	104	75 - 125	2	30
Cadmium	0.084	D	90.6	87.63	D	mg/Kg	☼	97	75 - 125	3	30
Chromium	5.9	D	90.6	84.84	D	mg/Kg	☼	87	75 - 125	1	30
Cobalt	11.7	D	90.6	104.1	D	mg/Kg	☼	102	75 - 125	1	30
Copper	17.9	D	90.6	108.8	D	mg/Kg	☼	100	75 - 125	1	30
Lead	3.2	D	90.6	90.81	D	mg/Kg	☼	97	75 - 125	3	30
Manganese	364	D N	90.6	546.1	D X	mg/Kg	☼	201	75 - 125	4	30
Molybdenum	0.48	D	45.3	45.19	D	mg/Kg	☼	99	75 - 125	3	30
Nickel	11.4	D	90.6	103.6	D	mg/Kg	☼	102	75 - 125	0	30
Selenium	2.3	D	45.3	43.71	D	mg/Kg	☼	91	75 - 125	1	30
Silver	0.070	U D	18.1	17.34	D	mg/Kg	☼	96	75 - 125	3	30
Strontium	21.9	D	90.6	122.0	D	mg/Kg	☼	110	75 - 125	1	30
Tin	0.55	D	90.6	88.70	D	mg/Kg	☼	97	75 - 125	3	30
Uranium	0.44	D	90.6	91.45	D	mg/Kg	☼	100	75 - 125	2	30
Vanadium	75.4	D	90.6	159.7	D	mg/Kg	☼	93	75 - 125	0	30
Zinc	53.1	D	90.6	145.9	D	mg/Kg	☼	102	75 - 125	1	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-405484/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.013	U	0.039	0.013	mg/Kg		12/13/18 08:50	12/13/18 13:48	1

Lab Sample ID: LCSSRM 160-405484/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.91	D	mg/Kg		94.9	59.7 - 139.1

Lab Sample ID: 160-32070-13 MS — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	1.03	1.08		mg/Kg	☼	105	80 - 120

Lab Sample ID: 160-32070-13 MSD — **Client Sample ID: B3KFP1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.02	1.07		mg/Kg	☼	104	80 - 120	1	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403925**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404213/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.8	2.2	mg/Kg		12/05/18 11:13	12/10/18 17:19	1
Lithium	1.3	U	4.4	1.3	mg/Kg		12/05/18 11:13	12/10/18 17:19	1

Lab Sample ID: LCS 160-404213/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.44	8.67		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-404213/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	72.24	D	mg/Kg		78.9	53.5 - 124.5

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U N D	20.1	8.39	B N D	mg/Kg	☼	42	75 - 125
Lithium	6.2	B D	10.0	17.63	D	mg/Kg	☼	114	75 - 125

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404939 — **Prep Batch: 404213**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U N D	19.6	7.97	B D N	mg/Kg	☼	41	75 - 125	5	30
Lithium	6.2	B D	9.81	16.51	D	mg/Kg	☼	105	75 - 125	7	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-404210/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.47	0.19	mg/Kg		12/05/18 11:05	12/13/18 13:56	2

Lab Sample ID: LCS 160-404210/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	45.3	46.14	D	mg/Kg		102	21 - 251

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.53	U D	49.5	49.13	D	mg/Kg	☼	99	75 - 125

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405765 — **Prep Batch: 404210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.53	U D	53.8	55.28	D	mg/Kg	☼	103	75 - 125	12	30

Lab Sample ID: MB 160-404212/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405766 — **Prep Batch: 404212**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.8	U D	4.4	1.8	mg/Kg		12/05/18 11:10	12/13/18 20:44	2

Lab Sample ID: MB 160-404212/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406071 — **Prep Batch: 404212**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Barium	0.44	U D	1.8	0.44	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Beryllium	0.035	U D	0.088	0.035	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Cadmium	0.021	U D	0.044	0.021	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Chromium	0.40	U D	0.88	0.40	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Cobalt	0.066	U D	0.18	0.066	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Copper	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Lead	0.11	U D	0.27	0.11	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Manganese	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Molybdenum	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Nickel	0.18	U D	0.44	0.18	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Selenium	0.28	U D	0.44	0.28	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Silver	0.066	U D	0.18	0.066	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Strontium	0.21	U D	0.44	0.21	mg/Kg		12/05/18 11:10	12/14/18 22:16	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-404212/1-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404212

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.080	U D	0.18	0.080	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Uranium	0.035	U D	0.088	0.035	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Vanadium	0.35	U D	0.88	0.35	mg/Kg		12/05/18 11:10	12/14/18 22:16	2
Zinc	1.8	U D	4.4	1.8	mg/Kg		12/05/18 11:10	12/14/18 22:16	2

Lab Sample ID: LCS 160-404212/2-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.4	89.41	D	mg/Kg		106	80 - 120

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 405766

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7307	D	mg/Kg		87.4	50.2 - 149.5

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	161	162.8	D	mg/Kg		101.1	70.2 - 129.8
Barium	260	266.1	D	mg/Kg		102.3	75.0 - 125.0
Beryllium	97.6	102.1	D	mg/Kg		104.6	75.0 - 125.0
Cadmium	211	219.8	D	mg/Kg		104.2	74.9 - 125.1
Chromium	136	128.6	D	mg/Kg		94.6	70.0 - 130.1
Cobalt	48.2	50.79	D	mg/Kg		105.4	74.9 - 124.9
Copper	166	173.4	D	mg/Kg		104.5	74.7 - 124.7
Lead	111	112.9	D	mg/Kg		101.8	71.0 - 128.8
Manganese	288	231.4	D	mg/Kg		80.4	57.3 - 101.0
Molybdenum	110	116.1	D	mg/Kg		105.5	70.5 - 129.1
Nickel	91.9	96.82	D	mg/Kg		105.3	70.0 - 129.5
Selenium	191	205.8	D	mg/Kg		107.7	68.6 - 131.9
Silver	43.3	43.59	D	mg/Kg		100.7	69.5 - 130.5
Strontium	107	121.3	D	mg/Kg		113.3	72.1 - 128.0

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-404212/3-A
Matrix: Solid
Analysis Batch: 406071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	99.22	D	mg/Kg		99.3	56.8 - 143.1
Vanadium	56.7	52.09	D	mg/Kg		91.9	56.8 - 143.4
Zinc	199	206.7	D	mg/Kg		103.9	69.8 - 130.2

Lab Sample ID: 160-32072-1 MS
Matrix: Soil
Analysis Batch: 405766

Client Sample ID: B3KFF5
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5560	D	1000	8240	X D	mg/Kg	☼	267	75 - 125

Lab Sample ID: 160-32072-1 MS
Matrix: Soil
Analysis Batch: 406071

Client Sample ID: B3KFF5
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.6	D	100	98.53	D	mg/Kg	☼	96	75 - 125
Barium	71.4	D	100	177.9	D	mg/Kg	☼	106	75 - 125
Beryllium	0.30	D	10.0	10.61	D	mg/Kg	☼	103	75 - 125
Cadmium	0.092	D	100	95.33	D	mg/Kg	☼	95	75 - 125
Chromium	9.1	D	100	93.48	D	mg/Kg	☼	84	75 - 125
Cobalt	9.4	D	100	106.5	D	mg/Kg	☼	97	75 - 125
Copper	14.9	D	100	110.1	D	mg/Kg	☼	95	75 - 125
Lead	5.1	D	100	100.1	D	mg/Kg	☼	95	75 - 125
Manganese	355	D N	100	486.3	D N	mg/Kg	☼	131	75 - 125
Molybdenum	0.47	B D	50.2	49.73	D	mg/Kg	☼	98	75 - 125
Nickel	11.1	D	100	108.9	D	mg/Kg	☼	97	75 - 125
Selenium	2.0	D	50.2	47.47	D	mg/Kg	☼	91	75 - 125
Silver	0.075	U D	20.1	19.03	D	mg/Kg	☼	95	75 - 125
Strontium	21.2	D	100	127.4	D	mg/Kg	☼	106	75 - 125
Tin	0.95	D	100	97.03	D	mg/Kg	☼	96	75 - 125
Uranium	0.47	D	100	97.62	D	mg/Kg	☼	97	75 - 125
Vanadium	63.2	D	100	148.5	D	mg/Kg	☼	85	75 - 125
Zinc	50.9	D	100	141.9	D	mg/Kg	☼	91	75 - 125

Lab Sample ID: 160-32072-1 MSD
Matrix: Soil
Analysis Batch: 405766

Client Sample ID: B3KFF5
Prep Type: Total/NA
Prep Batch: 404212

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5560	D	981	8604	X D	mg/Kg	☼	310	75 - 125	4	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406071 — **Prep Batch: 404212**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	2.6	D	98.1	95.73	D	mg/Kg	☼	95	75 - 125	3	30
Barium	71.4	D	98.1	179.2	D	mg/Kg	☼	110	75 - 125	1	30
Beryllium	0.30	D	9.81	10.69	D	mg/Kg	☼	106	75 - 125	1	30
Cadmium	0.092	D	98.1	97.29	D	mg/Kg	☼	99	75 - 125	2	30
Chromium	9.1	D	98.1	91.17	D	mg/Kg	☼	84	75 - 125	3	30
Cobalt	9.4	D	98.1	102.4	D	mg/Kg	☼	95	75 - 125	4	30
Copper	14.9	D	98.1	105.9	D	mg/Kg	☼	93	75 - 125	4	30
Lead	5.1	D	98.1	102.7	D	mg/Kg	☼	99	75 - 125	3	30
Manganese	355	D N	98.1	499.6	D N	mg/Kg	☼	147	75 - 125	3	30
Molybdenum	0.47	B D	49.1	50.08	D	mg/Kg	☼	101	75 - 125	1	30
Nickel	11.1	D	98.1	105.0	D	mg/Kg	☼	96	75 - 125	4	30
Selenium	2.0	D	49.1	44.82	D	mg/Kg	☼	87	75 - 125	6	30
Silver	0.075	U D	19.6	19.33	D	mg/Kg	☼	98	75 - 125	2	30
Strontium	21.2	D	98.1	133.2	D	mg/Kg	☼	114	75 - 125	4	30
Tin	0.95	D	98.1	97.88	D	mg/Kg	☼	99	75 - 125	1	30
Uranium	0.47	D	98.1	99.59	D	mg/Kg	☼	101	75 - 125	2	30
Vanadium	63.2	D	98.1	144.6	D	mg/Kg	☼	83	75 - 125	3	30
Zinc	50.9	D	98.1	137.5	D	mg/Kg	☼	88	75 - 125	3	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-404471/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		12/06/18 13:34	12/07/18 13:31	1

Lab Sample ID: LCSSRM 160-404471/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.89	D	mg/Kg		94.7	59.7 - 139.1

Lab Sample ID: 160-32072-1 MS — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	1.01	1.14		mg/Kg	☼	112	80 - 120

Lab Sample ID: 160-32072-1 MSD — **Client Sample ID: B3KFF5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404471**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.03	1.11		mg/Kg	☼	108	80 - 120	2	30

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8800-1, RL8843-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8800-1 and RL8843-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KF93	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF99	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF73	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF79	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF75	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFB7	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF95	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF77	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFD1	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFD3	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF81	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF83	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L185	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFC1	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFB9	11/26/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF97	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFB5	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFB3	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF85	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFC9	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFC7	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF69	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF71	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF87	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF89	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFC3	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L187	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFC5	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KF91	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3KFB1	11/28/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by

the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable with the following exception.

For SDG RL8843-1, the Pu-242 tracer recovery for sample B3KFC9 was above the upper acceptance limit. The Pu-238 sample result was a detect > the MDC and should be qualified as an estimate and should be flagged "J+." The Pu-239/240 sample result was < the MDC and should not be qualified.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDC, the precision limits are ones specified by the DV. procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided.

- **Completeness**

SDGs RL8800-1 and RL8843-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of Pu-238 result for sample B3KFC9 as an estimate was due to high tracer recovery.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8800-1, RL8843-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Pu-238	J+	B3KFC9	High tracer recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E

Project: RTL	Data Package: VSR19-012
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/16/19
	SDG: RL8800-1, RL8843-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241		

Samples/Matrix Soil

SDG RL8800-1 - B3KF93, B3KF99, B3KF73, B3KF79, B3KF75, B3KFB7, B3KF95, B3KF77, B3KFD1, B3KFD3, B3KF81, B3KF83, B3L185, B3KFC1, B3KFB9,

SDG RL8843-1 - B3KF97, B3KFB5, B3KFB3, B3KF85, B3KFC9, B3KFC7, B3KF69, B3KF71, B3KF87, B3KF89, B3KFC3, B3L187, B3KFC5, B3KF91, B3KFB1,

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No N/A
Calibration check acceptable?	Yes No N/A
Calibration check standards traceable?	Yes No N/A
Calibration check standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No N/A
Background counts acceptable?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☐ N/A
Chemical carrier added?	Yes No N/A
Chemical recovery acceptable?	Yes No N/A
Chemical carrier traceable? (Levels D, E)	Yes No N/A
Chemical carrier expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	Yes No N/A
Tracer recovery acceptable?	Yes No N/A
Tracer traceable? (Levels D, E)	Yes No N/A
Tracer expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG RL8843-1 - Pu-242 B3KFC9 117%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☐ N/A
Matrix spike analyzed?	Yes No (N/A)
Spike recoveries acceptable?	Yes No (N/A)
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

RPDs >30% - samples were < the MDC or differences between samples were <2X the MDCs.

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split sample(s) analyzed?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Samples B3KF87/B3L187 U-238 and U-233/234 <2X the MDCs.

Samples B3KFD1/B3L185 U-238 <2X the MDC

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	Yes No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	Yes No N/A
Results supported in raw data?(Levels D, E)	Yes No N/A
Results acceptable? (Levels D, E)	Yes No N/A
MDC's meet required reporting limits?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8800-1	B3KF93	88.2
300-8800-1 DU	B3KF93	88.0
300-8800-2	B3KF99	100
300-8800-3	B3KF73	84.0
300-8800-4	B3KF79	86.8
300-8800-5	B3KF75	91.5
300-8800-6	B3KFB7	97.6
300-8800-7	B3KF95	67.2
300-8800-8	B3KF77	95.6
300-8800-9	B3KFD1	92.1
300-8800-10	B3KFD3	96.8
300-8800-11	B3KF81	86.5
300-8800-12	B3KF83	88.2
300-8800-13	B3L185	93.7
300-8800-14	B3KFC1	105
300-8800-15	B3KFB9	94.3
LCS 300-16282/2-B	Lab Control Sample	89.2
MB 300-16282/1-B	Method Blank	82.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8800-1	B3KF93	32.0
300-8800-1 DU	B3KF93	43.7
300-8800-2	B3KF99	82.0
300-8800-3	B3KF73	57.9
300-8800-4	B3KF79	63.0
300-8800-5	B3KF75	81.6
300-8800-6	B3KFB7	95.9
300-8800-7	B3KF95	74.6
300-8800-8	B3KF77	79.4
300-8800-9	B3KFD1	89.5
300-8800-10	B3KFD3	84.2
300-8800-11	B3KF81	94.5
300-8800-12	B3KF83	93.1
300-8800-13	B3L185	92.3
300-8800-14	B3KFC1	93.0
300-8800-15	B3KFB9	80.3
LCS 300-16284/2-A	Lab Control Sample	83.4
MB 300-16284/1-A	Method Blank	60.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8800-1	B3KF93	112							
300-8800-1 DU	B3KF93	107							
300-8800-2	B3KF99	100							
300-8800-3	B3KF73	84.0							
300-8800-4	B3KF79	86.8							
300-8800-5	B3KF75	106							
300-8800-6	B3KFB7	97.6							
300-8800-7	B3KF95	67.2							
300-8800-8	B3KF77	95.6							
300-8800-9	B3KFD1	92.1							
300-8800-10	B3KFD3	96.8							
300-8800-11	B3KF81	86.5							
300-8800-12	B3KF83	88.2							
300-8800-13	B3L185	109							
300-8800-14	B3KFC1	105							
300-8800-15	B3KFB9	94.3							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16140/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0130	U		0.0606	0.370	0.0711	pCi/g	11/27/18 16:21	12/03/18 11:14	1

Lab Sample ID: LCS 300-16140/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.64	2.474		0.190	0.370	0.0970	pCi/g	94	80 - 120

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16373 — **Prep Batch: 16140**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.067	U	0.00959	U y	0.0789	0.370	0.0851	pCi/g	267	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16284/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16430 — **Prep Batch: 16284**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.00919	U	0.0357	0.0357	1.00	0.0941	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-233/234	-0.00353	U	0.0355	0.0355	1.00	0.0795	pCi/g	12/01/18 08:58	12/06/18 10:24	1
U-235/236	-0.00141	U	0.0354	0.0354	1.00	0.0698	pCi/g	12/01/18 08:58	12/06/18 10:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*60.5*		*30 - 105*	*12/01/18 08:58*	*12/06/18 10:24*	*1*

Lab Sample ID: LCS 300-16284/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16430 — **Prep Batch: 16284**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.88	3.351		0.706	1.00	0.0802	pCi/g	86	80 - 120
U-233/234	3.70	3.090		0.663	1.00	0.0782	pCi/g	83	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*83.4*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8800-1 DU
Matrix: Solid
Analysis Batch: 16430

Client Sample ID: B3KF93
Prep Type: Total/NA
Prep Batch: 16284

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0204	U		0.0721	U y	0.0944	1.00	0.132	pCi/g			112	30
U-233/234	0.149	U		0.184		0.147	1.00	0.117	pCi/g			21	30
U-235/236	-0.013	U		-0.00108	U y	0.0538	1.00	0.0987	pCi/g			168	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*43.7*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16282/1-B
Matrix: Solid
Analysis Batch: 16413

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16282

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0206	U	0.0430	0.0432	1.00	0.0859	pCi/g	12/01/18 08:08	12/13/18 09:35	1
Pu-239/240	-0.00242	U	0.0303	0.0303	1.00	0.0656	pCi/g	12/01/18 08:08	12/13/18 09:35	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*82.6*		*30 - 105*	*12/01/18 08:08*	*12/13/18 09:35*	*1*

Lab Sample ID: LCS 300-16282/2-B
Matrix: Solid
Analysis Batch: 16413

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16282

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.44	3.854		0.771	1.00	0.0637	pCi/g	87	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*89.2*		*30 - 105*

Lab Sample ID: 300-8800-1 DU
Matrix: Solid
Analysis Batch: 16413

Client Sample ID: B3KF93
Prep Type: Total/NA
Prep Batch: 16282

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.010	U		0.00325	U y	0.0206	1.00	0.0586	pCi/g			394	30
Pu-239/240	-0.0020	U		-0.00163	U	0.0204	1.00	0.0441	pCi/g			20	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*88.0*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8800-1
SDG: RL8800-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16283/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.506	U	0.0399	1.04	15.0	1.79	pCi/g	12/01/18 08:37	12/14/18 19:13	1

Lab Sample ID: LCS 300-16283/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			212	220.0		14.0	15.0	1.92	pCi/g	104	80 - 120		

Lab Sample ID: 300-8800-1 DU — **Client Sample ID: B3KF93**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16727 — **Prep Batch: 16283**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.44	U		1.026	U y	0.821	15.0	1.34	pCi/g			33	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*107*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8843-1	B3KF97	97.8
300-8843-1 DU	B3KF97	94.2
300-8843-2	B3KFB5	94.2
300-8843-3	B3KFB3	93.0
300-8843-4	B3KF85	99.6
300-8843-5	B3KFC9	117 X
300-8843-6	B3KFC7	103
300-8843-7	B3KF69	105
300-8843-8	B3KF71	94.4
300-8843-9	B3KF87	103
300-8843-10	B3KF89	101
300-8843-11	B3KFC3	99.0
300-8843-12	B3L187	103
300-8843-13	B3KFC5	99.1
300-8843-14	B3KF91	95.1
300-8843-15	B3KFB1	102
LCS 300-16386/2-A	Lab Control Sample	94.7
MB 300-16386/1-A	Method Blank	96.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8843-1	B3KF97	68.1
300-8843-1 DU	B3KF97	70.1
300-8843-2	B3KFB5	93.4
300-8843-3	B3KFB3	81.1
300-8843-4	B3KF85	78.4
300-8843-5	B3KFC9	66.9
300-8843-6	B3KFC7	85.8
300-8843-7	B3KF69	81.1
300-8843-8	B3KF71	84.0
300-8843-9	B3KF87	81.2
300-8843-10	B3KF89	74.8
300-8843-11	B3KFC3	71.0
300-8843-12	B3L187	64.1
300-8843-13	B3KFC5	67.2
300-8843-14	B3KF91	56.1
300-8843-15	B3KFB1	84.5
LCS 300-16387/2-A	Lab Control Sample	83.4
MB 300-16387/1-A	Method Blank	61.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8843-1	B3KF97	97.8							
300-8843-1 DU	B3KF97	94.2							
300-8843-2	B3KFB5	94.2							
300-8843-3	B3KFB3	93.0							
300-8843-4	B3KF85	105							
300-8843-5	B3KFC9	117							
300-8843-6	B3KFC7	103							
300-8843-7	B3KF69	105							
300-8843-8	B3KF71	94.4							
300-8843-9	B3KF87	103							
300-8843-10	B3KF89	101							
300-8843-11	B3KFC3	99.0							
300-8843-12	B3L187	103							
300-8843-13	B3KFC5	99.1							
300-8843-14	B3KF91	95.1							
300-8843-15	B3KFB1	102							
LCS 300-16414/2-A	Lab Control Sample	94.7							
MB 300-16414/1-A	Method Blank	96.1							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16372/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0137	U		0.0657	0.370	0.0493	pCi/g	12/05/18 13:09	12/20/18 06:50	1

Lab Sample ID: LCS 300-16372/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.518		0.191	0.370	0.0800	pCi/g	96	80 - 120		

Lab Sample ID: 300-8843-1 DU — **Client Sample ID: B3KF97**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16858 — **Prep Batch: 16372**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.059	U		-0.136	U y	0.121	0.370	0.0630	pCi/g			79	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16387/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16664 — **Prep Batch: 16387**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0119	U	0.0399	0.0399	1.00	0.101	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-233/234	-0.00237	U	0.0397	0.0397	1.00	0.0823	pCi/g	12/05/18 15:35	12/12/18 16:26	1
U-235/236	0.0190	U	0.0396	0.0397	1.00	0.0726	pCi/g	12/05/18 15:35	12/12/18 16:26	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*61.7*		*30 - 105*	*12/05/18 15:35*	*12/12/18 16:26*	*1*

Lab Sample ID: LCS 300-16387/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16664 — **Prep Batch: 16387**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.37	3.670		0.735	1.00	0.0564	pCi/g	109	80 - 120		
U-233/234			3.22	3.240		0.665	1.00	0.0643	pCi/g	101	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*83.4*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8843-1 DU
Matrix: Solid
Analysis Batch: 16664

Client Sample ID: B3KF97
Prep Type: Total/NA
Prep Batch: 16387

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.306			0.0833	U y	0.0823	1.00	0.0928	pCi/g			114	30
U-233/234	0.274			0.154	y	0.112	1.00	0.0964	pCi/g			56	30
U-235/236	-0.00065	U		-0.00435	U y	0.0364	1.00	0.0841	pCi/g			148	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*70.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16386/1-A
Matrix: Solid
Analysis Batch: 16663

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16386

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00478	U	0.0268	0.0268	1.00	0.0666	pCi/g	12/05/18 15:32	12/12/18 16:40	1
Pu-239/240	0.000	U	0.0266	0.0266	1.00	0.0488	pCi/g	12/05/18 15:32	12/12/18 16:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.1*		*30 - 105*	*12/05/18 15:32*	*12/12/18 16:40*	*1*

Lab Sample ID: LCS 300-16386/2-A
Matrix: Solid
Analysis Batch: 16663

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16386

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.81	4.946		0.949	1.00	0.0603	pCi/g	103	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*94.7*		*30 - 105*

Lab Sample ID: 300-8843-1 DU
Matrix: Solid
Analysis Batch: 16663

Client Sample ID: B3KF97
Prep Type: Total/NA
Prep Batch: 16386

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0832			0.205	y	0.112	1.00	0.0759	pCi/g			85	30
Pu-239/240	0.00569	U		-0.000534	U y	0.0267	1.00	0.0490	pCi/g			241	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*94.2*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-040

TestAmerica Job ID: 300-8843-1
SDG: RL8843-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16414/1-A
Matrix: Solid
Analysis Batch: 16922

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16414

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.102	U	0.184	1.73	15.0	3.17	pCi/g	12/06/18 11:56	12/20/18 13:43	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.1*			*12/06/18 11:56*	*12/20/18 13:43*	*1*

Lab Sample ID: LCS 300-16414/2-A
Matrix: Solid
Analysis Batch: 16922

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16414

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			229	255.0		17.5	15.0	3.60	pCi/g	111	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*94.7*		

Lab Sample ID: 300-8843-1 DU
Matrix: Solid
Analysis Batch: 16903

Client Sample ID: B3KF97
Prep Type: Total/NA
Prep Batch: 16414

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.36	U		-0.602	U	1.61	15.0	3.19	pCi/g			13	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*94.2*		

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
02/05/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-021		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
02/05/2019 Date Scot Fitzgerald Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	02/05/2019 Date Reviewer/Point of Contact (print and sign) Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					Closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2/5/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-021		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval

Jadie Kaas

2/5/2019 — Date

Jadie Kaas — Organization Manager (optional) (print and sign)

10. Agreement With Indicated Comment Disposition(s)

Date

Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

2/5/2019 — Date

Jadie Kaas

Jadie Kaas — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR19-021
Project RTL

Chemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 02-05-2019**

Technical Review By: Ellen McEntee **Date: 02-05-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 02-06-2019**

Mary Donivan
Quality Assurance Manager

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Date: 05 February 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Group (SDG) SL32017-2

INTRODUCTION

This memorandum presents the results of data validation for SDG SL32017-2 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KFH1	11/26/18	Soil	C	6010D, 6020B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The sample was analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32017-2, the MS and MSD recoveries for Al and Mn were above the upper acceptance limit. The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified as a result. The Mn result for sample B3KFH1 was a detect and should be qualified as an estimate and flagged "J+."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existence and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for As, Be, Cd, Cr, Pb and Zn were met. No other CRDLs were provided.

- **Completeness**

SDG SL32017-2 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of the Mn result for sample B3KFH1 as an estimate was due to high matrix spike recoveries.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: SL32017-2	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Mn	J+	B3KFH1	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-021		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 02/05/19	
			SDG: SL32017-2		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SL32017-2: B3KFH1					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SL32017-2: MS/MSD, Al 232%/230%, Mn 145%/133% (Al parent result >4X spike conc.)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No (N/A)
ICP serial dilution %D values acceptable?	Yes No (N/A)
ICP post digestion spike required?	Yes No (N/A)
ICP post digestion spike values acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb and Zn were provided.

Appendix 4

Additional Documentation Requested By Client

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-2
SDG: SL32017-2

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-410220/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 410567 — **Prep Batch: 410220**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.22	U	0.88	0.22	mg/Kg		01/11/19 09:41	01/14/19 14:11	1

Lab Sample ID: LCSSRM 160-410220/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 410567 — **Prep Batch: 410220**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	136	139.1	D	mg/Kg		102.2	70.0 - 130.1

Lab Sample ID: 160-32017-11 MS — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410567 — **Prep Batch: 410220**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	6.9	D	106	105.7	D	mg/Kg	☼	93	75 - 125

Lab Sample ID: 160-32017-11 MSD — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410567 — **Prep Batch: 410220**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	6.9	D	96.1	94.95	D	mg/Kg	☼	92	75 - 125	11	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-410216/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 410570 — **Prep Batch: 410216**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.8	U D	4.4	1.8	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Arsenic	0.35	U D	0.88	0.35	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Barium	0.44	U D	1.8	0.44	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Beryllium	0.035	U D	0.088	0.035	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Cadmium	0.021	U D	0.044	0.021	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Chromium	0.40	U D	0.88	0.40	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Cobalt	0.066	U D	0.18	0.066	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Copper	0.35	U D	0.88	0.35	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Lead	0.11	U D	0.26	0.11	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Manganese	0.18	U D	0.44	0.18	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Molybdenum	0.18	U D	0.44	0.18	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Nickel	0.18	U D	0.44	0.18	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Silver	0.066	U D	0.18	0.066	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Strontium	0.21	U D	0.44	0.21	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Tin	0.079	U D	0.18	0.079	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Uranium	0.035	U D	0.088	0.035	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Vanadium	0.35	U D	0.88	0.35	mg/Kg		01/11/19 09:06	01/14/19 16:39	2
Zinc	1.8	U D	4.4	1.8	mg/Kg		01/11/19 09:06	01/14/19 16:39	2

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-041

TestAmerica Job ID: 160-32017-2
SDG: SL32017-2

Lab Sample ID: MB 160-410216/1-A
Matrix: Solid
Analysis Batch: 410906

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 410216

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	0.28	U D	0.44	0.28	mg/Kg		01/11/19 09:06	01/16/19 12:05	2

Lab Sample ID: LCS 160-410216/2-A
Matrix: Solid
Analysis Batch: 410570

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 410216

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	86.9	85.73	D	mg/Kg		99	80 - 120

Lab Sample ID: LCSSRM 160-410216/3-A
Matrix: Solid
Analysis Batch: 410570

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 410216

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7552	D	mg/Kg		90.3	50.2 - 149.5
Arsenic	161	185.0	D	mg/Kg		114.9	70.2 - 129.8
Barium	260	293.8	D	mg/Kg		113.0	75.0 - 125.0
Beryllium	97.6	106.7	D	mg/Kg		109.4	75.0 - 125.0
Cadmium	211	223.5	D	mg/Kg		105.9	74.9 - 125.1
Chromium	136	148.4	D	mg/Kg		109.1	70.0 - 130.1
Cobalt	48.2	54.32	D	mg/Kg		112.7	74.9 - 124.9
Copper	166	192.9	D	mg/Kg		116.2	74.7 - 124.7
Lead	111	120.3	D	mg/Kg		108.4	71.0 - 128.8
Manganese	288	244.4	D	mg/Kg		84.9	57.3 - 101.0
Molybdenum	110	120.3	D	mg/Kg		109.4	70.5 - 129.1
Nickel	91.9	105.5	D	mg/Kg		114.8	70.0 - 129.5
Silver	43.3	47.46	D	mg/Kg		109.6	69.5 - 130.5
Strontium	107	118.2	D	mg/Kg		110.5	72.1 - 128.0
Tin	99.9	109.7	D	mg/Kg		109.8	56.8 - 143.1
Vanadium	56.7	60.83	D	mg/Kg		107.3	56.8 - 143.4
Zinc	199	222.1	D	mg/Kg		111.6	69.8 - 130.2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-410216/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 410906 — **Prep Batch: 410216**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	191	216.7	D	mg/Kg		113.5	68.6 - 131.9

Lab Sample ID: 160-32017-11 MS — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410570 — **Prep Batch: 410216**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5870	D	1060	8326	X D	mg/Kg	☼	232	75 - 125
Arsenic	2.4	D	106	106.4	D	mg/Kg	☼	98	75 - 125
Barium	74.0	D	106	183.7	D	mg/Kg	☼	104	75 - 125
Beryllium	0.31	D	10.6	11.43	D	mg/Kg	☼	105	75 - 125
Cadmium	0.11	D	106	107.8	D	mg/Kg	☼	102	75 - 125
Chromium	7.3	D	106	104.5	D	mg/Kg	☼	92	75 - 125
Cobalt	9.8	D	106	115.4	D	mg/Kg	☼	100	75 - 125
Copper	14.8	D	106	122.9	D	mg/Kg	☼	102	75 - 125
Lead	4.2	D	106	109.4	D	mg/Kg	☼	99	75 - 125
Manganese	365	N D	106	518.8	D N	mg/Kg	☼	145	75 - 125
Molybdenum	0.43	B D	53.0	54.64	D	mg/Kg	☼	102	75 - 125
Nickel	10.9	D	106	116.2	D	mg/Kg	☼	99	75 - 125
Silver	0.078	U D	21.2	21.51	D	mg/Kg	☼	101	75 - 125
Strontium	20.7	D	106	131.6	D	mg/Kg	☼	105	75 - 125
Tin	0.51	D	106	104.5	D	mg/Kg	☼	98	75 - 125
Uranium	0.41	D	106	106.5	D	mg/Kg	☼	100	75 - 125
Vanadium	68.8	D	106	174.3	D	mg/Kg	☼	100	75 - 125
Zinc	50.8	D	106	153.6	D	mg/Kg	☼	97	75 - 125

Lab Sample ID: 160-32017-11 MS — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410906 — **Prep Batch: 410216**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	1.7	D	53.0	49.62	D	mg/Kg	☼	90	75 - 125

Lab Sample ID: 160-32017-11 MSD — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410570 — **Prep Batch: 410216**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5870	D	961	8076	X D	mg/Kg	☼	230	75 - 125	3	30
Arsenic	2.4	D	96.1	95.94	D	mg/Kg	☼	97	75 - 125	10	30
Barium	74.0	D	96.0	177.7	D	mg/Kg	☼	108	75 - 125	3	30
Beryllium	0.31	D	9.61	10.23	D	mg/Kg	☼	103	75 - 125	11	30
Cadmium	0.11	D	96.1	96.06	D	mg/Kg	☼	100	75 - 125	12	30
Chromium	7.3	D	96.1	94.74	D	mg/Kg	☼	91	75 - 125	10	30
Cobalt	9.8	D	96.1	103.8	D	mg/Kg	☼	98	75 - 125	11	30
Copper	14.8	D	96.1	112.9	D	mg/Kg	☼	102	75 - 125	8	30
Lead	4.2	D	96.1	97.94	D	mg/Kg	☼	98	75 - 125	11	30
Manganese	365	N D	96.1	493.0	N D	mg/Kg	☼	133	75 - 125	5	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32017-11 MSD — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410570 — **Prep Batch: 410216**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Molybdenum	0.43	B D	48.0	48.43	D	mg/Kg	☼	100	75 - 125	12	30
Nickel	10.9	D	96.1	104.6	D	mg/Kg	☼	97	75 - 125	11	30
Silver	0.078	U D	19.2	19.23	D	mg/Kg	☼	100	75 - 125	11	30
Strontium	20.7	D	96.1	119.4	D	mg/Kg	☼	103	75 - 125	10	30
Tin	0.51	D	96.1	93.44	D	mg/Kg	☼	97	75 - 125	11	30
Uranium	0.41	D	96.0	95.11	D	mg/Kg	☼	99	75 - 125	11	30
Vanadium	68.8	D	96.1	154.9	D	mg/Kg	☼	90	75 - 125	12	30
Zinc	50.8	D	96.1	138.6	D	mg/Kg	☼	91	75 - 125	10	30

Lab Sample ID: 160-32017-11 MSD — **Client Sample ID: B3KFH1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 410906 — **Prep Batch: 410216**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	1.7	D	48.0	45.02	D	mg/Kg	☼	90	75 - 125	10	30

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01/10/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-011		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
01/10/2019 Date Scot Fitzgerald Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/10/2019 Date Reviewer/Point of Contact (print and sign) Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1.	On page 190 under the precision discussion, the 2,4-DB RPD failure is not discussed.		Add 2,4-DB to narrative			Closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	1/10/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-011 VSR19-011 Rev. 1		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/10/2019 Jadie Kaas Date Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/10/2019 Jadie Kaas Date Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT accepted**)	16. Status
1	No other issues noted than the one comment reported on Scot Fitzgerald's RCR dated 1/10/19					closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-011
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-08-2019**

Technical Review By: Ellen McEntee **Date: 01-09-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 01-10-2019**

Mary Donivan
Quality Assurance Manager

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Date: 08 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Groups (SDGs) SL31841-1, SL31884-1, SL31887-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31841-1, SL31884-1 and SL31887-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KLB6	11/12/18	Soil	C	8260C
B3KL87	11/12/18	Soil	C	8260C
B3KLB1	11/12/18	Soil	C	8260C
B3KL88	11/12/18	Soil	C	8260C
B3KLB2	11/12/18	Soil	C	8260C
B3KLC2	11/12/18	Soil	C	8260C
B3KL92	11/13/18	Soil	C	8260C
B3KL94	11/13/18	Soil	C	8260C
B3KL89	11/13/18	Soil	C	8260C
B3KL98	11/13/18	Soil	C	8260C
B3KLB7	11/13/18	Soil	C	8260C
B3KL97	11/13/18	Soil	C	8260C
B3KL99	11/14/18	Soil	C	8260C
B3KLC5	11/14/18	Soil	C	8260C
B3KLB3	11/14/18	Soil	C	8260C
B3KLB0	11/14/18	Soil	C	8260C
B3KL95	11/14/18	Soil	C	8260C
B3KL93	11/14/18	Soil	C	8260C
B3KL96	11/14/18	Soil	C	8260C
B3KLC3	11/14/18	Soil	C	8260C
B3KLC4	11/14/18	Soil	C	8260C
B3KLB5	11/14/18	Soil	C	8260C
B3KLB4	11/14/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding time and properly preserved with the following exceptions.

For SDG SL31841-1, sample B3KL88 was extracted beyond the 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR"

For SDG SL31884-1, sample B3KL92 was extracted beyond the 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR"

For SDG SL31887-1, samples B3KLB3, BKLB0, B3KLB5 and B3KLB4 were extracted beyond the 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR"

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG SL31887-1, batch 405936, the methylene chloride laboratory blank result was > the method detection limit (MDL) but < the reporting limit (RL). All associated sample results were non-detects and should not be qualified for the blank infraction.

Trip Blanks

All trip blank results were acceptable.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL31841-1, the 4-bromofluorobenzene and toluene surrogate recoveries for sample B3KL87 were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." The 1,2-dichloroethane-d4 surrogate recoveries for samples B3KLB1, B3KLB2 and B3KLC2 were above the upper acceptance limit. All results for these samples were non-detects and should not be qualified as a result.

For SDG SL31884-1, the 1,2-dichloroethane-d4 surrogate recoveries for samples B3KL94, B3KL89, B3KL98, B3KLB7 and B3KL94 and the 4-dibromofluorobenzene surrogate recovery for sample B3KL98 were above the acceptance limit. All results for these samples were non-detects and should not be qualified as a result.

For SDG SL31887-1, the 1,2-dichloroethane-d4 surrogate recoveries for samples B3KL99, B3KLC5, B3KL95, B3KL93, B3KL96, B3KLC3, B3KLC4 and LCS (403184) were above the upper acceptance limit. All results for these samples were non-detects and should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31887-1, batch 405936, the MS and MSD recoveries for chloroethane were below the lower acceptance limit but ≥20%. All associated chloroethane sample results were non-detects. The chloroethane results for samples B3KL99 and B3KLC5 should be qualified as estimates and flagged "UJ." The chloroethane results for samples BKLB3, B3KLB0, B3KLB5 and B3KLB4 would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable with the following exceptions.

For SDG SL31841-1, batch 402637, the LCS and LCSD recoveries for bromomethane and chloroethane were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified for the recoveries infractions.

For SDG SL31884-1, batch 402637, the LCS and LCSD recoveries for bromomethane and chloroethane were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified for the recoveries infractions.

For SDG SL31887-1, batches 402637 and 403177, the LCS and/or LCSD recoveries for bromomethane and chloroethane were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified for the recoveries infractions.

For SDG SL31887-1, batch 405936, the LCS and LCSD recoveries for chloroethane were below the lower acceptance limit. All associated chloroethane sample results were non-detects. The chloroethane result for samples B3KL99 and B3KLC5 should be qualified as estimates and flagged "UJ." The chloroethane results for samples BKLB3, B3KLB0, B3KLB5 and B3KLB4 would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

LCS/LCSD Samples

All reported LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The MDL for methylene chloride met the required CRDL. No other CRDLs for VOCs were provided in the SAP.

- **Completeness**

SDGs SL31841-1, SL31884-1 and SL31887-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 73%.

MAJOR DEFICIENCIES

Major deficiency leading to qualified of all target analytes for samples B3KL88, B3KL92, B3KLB3, B3KLB0, B3KLB5 and B3KLB4 were due to analysis beyond 2X the holding time.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recoveries, low matrix spike recoveries and low LCS/LCSD recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDGs: SL31841-1, SL31884-1, SL31887-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloroethene, total, 1,2-dichloropropane, 2-butanone (MEK), 2-hexanone, 4-methyl-2-pentanone (MIBK), acetone, benzene, bromodichloromethane, bromoform, bromomethane, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, cis-1,3-dichloropropene, dibromochloromethane, ethylbenzene, methylene chloride, styrene, tetrachloroethene, toluene, trans-1,3-dichloropropene, trichloroethene, vinyl chloride, xylene, total	UR	B3KL88, B3KL92, B3KLB3, B3KLB0, B3KLB5, B3KLB4	Analyzed beyond 2X the holding time
chloroethane	UR	B3KL88, B3KL92,	Analyzed beyond 2X the holding time
chloroethane	UR	B3KLB3, B3KLB0, B3KLB5, B3KLB4	Analyzed beyond 2X the holding time, low matrix

			spike recoveries and low LCS/LCSD recoveries
chloroethane	UJ	B3KL99, B3KLC5	Low matrix spike recoveries and low LCS/LCSD recoveries
1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloroethene, total, 1,2-dichloropropane, 2-butanone (MEK), 2-hexanone, 4-methyl-2-pentanone (MIBK), acetone, benzene, bromodichloromethane, bromoform, bromomethane, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroethane, chloroform, chloromethane, cis-1,3-dichloropropene, dibromochloromethane, ethylbenzene, methylene chloride, styrene, tetrachloroethene, toluene, trans-1,3-dichloropropene, trichloroethene, vinyl chloride, xylene, total	UJ	B3KL87	Low surrogate recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/08/19	
			SDG: SL31841-1, SL31884-1, SL31887-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL31841-1: B3KLB6, B3KL87, B3KLB1, B3KL88, B3KLB2, B3KLC2					
SDG SL31884-1: B3KL92, B3KL94, B3KL89, B3KL98, B3KLB7, B3KL97					
SDG SL31887-1: B3KL99, B3KLC5, B3KLB3, B3KLB0, B3KL95, B3KL93, B3KL96, B3KLC3, B3KLC4, B3KLB5, B3KLB4					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field/trip blanks analyzed? (Levels C, D, E)	(Yes) No N/A
Field/trip blank results acceptable? (Levels C, D, E)	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG SL31887-1 (batch 405936) methylene chloride 3.89 ug/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

SDG SL31841-1: B3KL87 BFB 42%, TOL 45%: B3KLB1 DCA 134%; B3KLB2 DCA 142%; B3KLC2 DCA 200%;

SDG SL31884-1: B3KL94 DCA 146%; B3KL89 DCA 147%; B3KL98 DCA 164%, DBFM 144%;
B3KLB7 DCA 156%; B3KL97 DCA 147%

SDG SL31887-1: B3KL99 DCA 140%; B3KLC5 DCA 164%; B3KL95 DCA 151%; B3KL93 DCA 151%;
B3KL96 DCA 156%; B3KLC3 DCA 156%; B3KLC4 DCA 151%; LCS-403184 DCA 133%

LCS/LCSD

SDG SL31841-1: (batch 402637) bromomethane 167%/151%; chloroethane 155%/144%
SDG SL31884-1: (batch 402637) bromomethane 167%/151%; chloroethane 155%/144%

SDG SL31887-1: (batch 402637) bromomethane 167%/151%, chloroethane 155%/144%
(batch 403177) bromomethane 162%/172%; chloroethane LCSD 147%
(batch 405936) chloroethane 64%/65%

Matrix Spike

SDG SL31887-1: (batch 405936) chloroethane 67%/67%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD RPD values acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No (N/A)
Internal standard areas acceptable?	Yes No (N/A)
Internal standard retention times acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SDG SL31841-1: B3KL88 extracted beyond 2X holding time.

SDG SL31884-1: B3KL92 extracted beyond 2X holding time.

SDG SL31887-1: B3KLB3, B3KLB0 B3KLB5, B3KLB4 were extracted beyond 2X holding time.

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Detection limit was reported for methylene chloride only.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-402637/10
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			11/26/18 14:14	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			11/26/18 14:14	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			11/26/18 14:14	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			11/26/18 14:14	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			11/26/18 14:14	1
Acetone	6.5	U	20	6.5	ug/Kg			11/26/18 14:14	1
Benzene	0.26	U	5.0	0.26	ug/Kg			11/26/18 14:14	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			11/26/18 14:14	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			11/26/18 14:14	1
Bromomethane	2.4	U	10	2.4	ug/Kg			11/26/18 14:14	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			11/26/18 14:14	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			11/26/18 14:14	1
Chloroethane	2.0	U	10	2.0	ug/Kg			11/26/18 14:14	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			11/26/18 14:14	1
Chloromethane	0.65	U	10	0.65	ug/Kg			11/26/18 14:14	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			11/26/18 14:14	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
Styrene	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			11/26/18 14:14	1
Toluene	2.5	U	5.0	2.5	ug/Kg			11/26/18 14:14	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			11/26/18 14:14	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*11/26/18 14:14*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*126*		*67 - 132*		*11/26/18 14:14*	*1*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*		*11/26/18 14:14*	*1*
Dibromofluoromethane (Surr)	*114*		*53 - 143*		*11/26/18 14:14*	*1*
Toluene-d8 (Surr)	*102*		*74 - 135*		*11/26/18 14:14*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-402637/5
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	61.0		ug/Kg		122	71 - 127
1,1,2,2-Tetrachloroethane	50.0	36.5		ug/Kg		73	52 - 140
1,1,2-Trichloroethane	50.0	46.7		ug/Kg		93	79 - 122
1,1-Dichloroethane	50.0	54.2		ug/Kg		108	80 - 120
1,1-Dichloroethene	50.0	46.5		ug/Kg		93	71 - 126
1,2-Dichloroethane	50.0	61.6		ug/Kg		123	68 - 128
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121
1,2-Dichloropropane	50.0	49.4		ug/Kg		99	80 - 126
2-Butanone (MEK)	50.0	44.8		ug/Kg		90	41 - 140
2-Hexanone	50.0	38.5		ug/Kg		77	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	44.1		ug/Kg		88	67 - 130
Acetone	50.0	50.3		ug/Kg		101	39 - 140
Benzene	50.0	51.3		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	59.0		ug/Kg		118	78 - 124
Bromoform	50.0	48.1		ug/Kg		96	67 - 135
Bromomethane	50.0	83.7	o	ug/Kg		167	61 - 132
Carbon disulfide	50.0	46.7		ug/Kg		93	74 - 124
Carbon tetrachloride	50.0	57.7		ug/Kg		115	68 - 130
Chlorobenzene	50.0	53.5		ug/Kg		107	80 - 120
Chloroethane	50.0	77.5	o	ug/Kg		155	73 - 129
Chloroform	50.0	56.0		ug/Kg		112	78 - 120
Chloromethane	50.0	43.1		ug/Kg		86	69 - 123
cis-1,3-Dichloropropene	50.0	57.9		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	56.8		ug/Kg		114	77 - 126
Ethylbenzene	50.0	54.9		ug/Kg		110	79 - 126
Methylene Chloride	50.0	47.3		ug/Kg		95	76 - 120
Styrene	50.0	55.0		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	55.4		ug/Kg		111	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136
Trichloroethene	50.0	55.5		ug/Kg		111	66 - 130
Vinyl chloride	50.0	48.5		ug/Kg		97	56 - 134
Xylenes, Total	100	112		ug/Kg		112	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*120*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*112*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.9		ug/Kg		114	71 - 127	7	20
1,1,2,2-Tetrachloroethane	50.0	39.6		ug/Kg		79	52 - 140	8	20
1,1,2-Trichloroethane	50.0	48.1		ug/Kg		96	79 - 122	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	54.4		ug/Kg		109	80 - 120	1	20
1,1-Dichloroethene	50.0	43.4		ug/Kg		87	71 - 126	7	20
1,2-Dichloroethane	50.0	63.2		ug/Kg		126	68 - 128	3	20
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121	0	20
1,2-Dichloropropane	50.0	50.3		ug/Kg		101	80 - 126	2	20
2-Butanone (MEK)	50.0	46.8		ug/Kg		94	41 - 140	4	20
2-Hexanone	50.0	45.1		ug/Kg		90	63 - 136	16	20
4-Methyl-2-pentanone (MIBK)	50.0	46.1		ug/Kg		92	67 - 130	4	20
Acetone	50.0	52.7		ug/Kg		105	39 - 140	5	20
Benzene	50.0	51.8		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	61.2		ug/Kg		122	78 - 124	4	20
Bromoform	50.0	49.8		ug/Kg		100	67 - 135	4	20
Bromomethane	50.0	75.3	o	ug/Kg		151	61 - 132	11	20
Carbon disulfide	50.0	51.9		ug/Kg		104	74 - 124	11	20
Carbon tetrachloride	50.0	59.4		ug/Kg		119	68 - 130	3	20
Chlorobenzene	50.0	53.2		ug/Kg		106	80 - 120	1	20
Chloroethane	50.0	72.2	o	ug/Kg		144	73 - 129	7	20
Chloroform	50.0	57.0		ug/Kg		114	78 - 120	2	20
Chloromethane	50.0	41.4		ug/Kg		83	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	60.6		ug/Kg		121	78 - 127	5	20
Dibromochloromethane	50.0	58.0		ug/Kg		116	77 - 126	2	20
Ethylbenzene	50.0	54.0		ug/Kg		108	79 - 126	2	20
Methylene Chloride	50.0	47.5		ug/Kg		95	76 - 120	0	20
Styrene	50.0	53.6		ug/Kg		107	80 - 129	3	20
Tetrachloroethene	50.0	54.4		ug/Kg		109	76 - 126	2	20
Toluene	50.0	52.9		ug/Kg		106	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136	0	20
Trichloroethene	50.0	55.1		ug/Kg		110	66 - 130	1	20
Vinyl chloride	50.0	48.4		ug/Kg		97	56 - 134	0	20
Xylenes, Total	100	109		ug/Kg		109	79 - 132	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*127*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*115*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/26/18 07:01	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/26/18 07:01	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/26/18 07:01	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/26/18 07:01	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/26/18 07:01	1
Acetone	6.5	U	20	6.5	ug/Kg			12/26/18 07:01	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/26/18 07:01	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/26/18 07:01	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/26/18 07:01	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/26/18 07:01	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/26/18 07:01	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/26/18 07:01	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/26/18 07:01	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/26/18 07:01	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/26/18 07:01	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/26/18 07:01	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/26/18 07:01	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/26/18 07:01	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/26/18 07:01	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/26/18 07:01*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*		*12/26/18 07:01*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 150*		*12/26/18 07:01*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/26/18 07:01*	*1*
Toluene-d8 (Surr)	*100*		*74 - 135*		*12/26/18 07:01*	*1*

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.9		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	49.0		ug/Kg		98	52 - 140
1,1,2-Trichloroethane	50.0	49.0		ug/Kg		98	79 - 122
1,1-Dichloroethane	50.0	50.4		ug/Kg		101	80 - 120

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126
1,2-Dichloroethane	50.0	47.8		ug/Kg		96	68 - 128
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121
1,2-Dichloropropane	50.0	51.3		ug/Kg		103	80 - 126
2-Butanone (MEK)	50.0	46.0		ug/Kg		92	41 - 140
2-Hexanone	50.0	43.2		ug/Kg		86	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	43.4		ug/Kg		87	39 - 140
Benzene	50.0	52.1		ug/Kg		104	80 - 120
Bromodichloromethane	50.0	49.6		ug/Kg		99	78 - 124
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	50.7		ug/Kg		101	61 - 132
Carbon disulfide	50.0	53.0		ug/Kg		106	74 - 124
Carbon tetrachloride	50.0	51.1		ug/Kg		102	68 - 130
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120
Chloroethane	50.0	48.1		ug/Kg		96	73 - 129
Chloroform	50.0	49.1		ug/Kg		98	78 - 120
Chloromethane	50.0	45.4		ug/Kg		91	69 - 123
cis-1,3-Dichloropropene	50.0	54.3		ug/Kg		109	78 - 127
Dibromochloromethane	50.0	50.3		ug/Kg		101	77 - 126
Ethylbenzene	50.0	51.4		ug/Kg		103	79 - 126
Methylene Chloride	50.0	51.6		ug/Kg		103	76 - 120
Styrene	50.0	54.2		ug/Kg		108	80 - 129
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	52.7		ug/Kg		105	77 - 136
Trichloroethene	50.0	50.5		ug/Kg		101	66 - 130
Vinyl chloride	50.0	53.8		ug/Kg		108	56 - 134
Xylenes, Total	100	114		ug/Kg		114	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	52.8		ug/Kg		106	52 - 140	7	20
1,1,2-Trichloroethane	50.0	50.9		ug/Kg		102	79 - 122	4	20
1,1-Dichloroethane	50.0	51.0		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	53.0		ug/Kg		106	71 - 126	1	20
1,2-Dichloroethane	50.0	48.5		ug/Kg		97	68 - 128	2	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane			50.0	52.3		ug/Kg		105	80 - 126	2	20
2-Butanone (MEK)			50.0	50.7		ug/Kg		101	41 - 140	10	20
2-Hexanone			50.0	48.7		ug/Kg		97	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)			50.0	46.4		ug/Kg		93	67 - 130	7	20
Acetone			50.0	47.0		ug/Kg		94	39 - 140	8	20
Benzene			50.0	52.1		ug/Kg		104	80 - 120	0	20
Bromodichloromethane			50.0	50.8		ug/Kg		102	78 - 124	2	20
Bromoform			50.0	52.8		ug/Kg		106	67 - 135	8	20
Bromomethane			50.0	50.2		ug/Kg		100	61 - 132	1	20
Carbon disulfide			50.0	52.8		ug/Kg		106	74 - 124	0	20
Carbon tetrachloride			50.0	50.9		ug/Kg		102	68 - 130	0	20
Chlorobenzene			50.0	51.9		ug/Kg		104	80 - 120	0	20
Chloroethane			50.0	46.2		ug/Kg		92	73 - 129	4	20
Chloroform			50.0	49.8		ug/Kg		100	78 - 120	2	20
Chloromethane			50.0	45.1		ug/Kg		90	69 - 123	1	20
cis-1,3-Dichloropropene			50.0	55.7		ug/Kg		111	78 - 127	3	20
Dibromochloromethane			50.0	52.9		ug/Kg		106	77 - 126	5	20
Ethylbenzene			50.0	51.9		ug/Kg		104	79 - 126	1	20
Methylene Chloride			50.0	52.2		ug/Kg		104	76 - 120	1	20
Styrene			50.0	55.0		ug/Kg		110	80 - 129	2	20
Tetrachloroethene			50.0	51.6		ug/Kg		103	76 - 126	1	20
Toluene			50.0	54.8		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene			50.0	55.1		ug/Kg		110	77 - 136	4	20
Trichloroethene			50.0	50.3		ug/Kg		101	66 - 130	0	20
Vinyl chloride			50.0	51.6		ug/Kg		103	56 - 134	4	20
Xylenes, Total			100	114		ug/Kg		114	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-31841-4 MS
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL88
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane	0.40	U Z	45.0	49.0		ug/Kg	☼	109	80 - 120		
1,1,2,2-Tetrachloroethane	1.8	U Z	45.0	43.6		ug/Kg	☼	97	78 - 120		
1,1,2-Trichloroethane	1.1	U Z	45.0	42.8		ug/Kg	☼	95	80 - 120		
1,1-Dichloroethane	0.36	U Z	45.0	45.8		ug/Kg	☼	102	80 - 120		
1,1-Dichloroethene	1.5	U Z	45.0	47.0		ug/Kg	☼	104	78 - 121		
1,2-Dichloroethane	0.80	U Z	45.0	45.9		ug/Kg	☼	102	78 - 117		
1,2-Dichloroethene, Total	1.2	U Z	90.1	93.2		ug/Kg	☼	103	80 - 120		
1,2-Dichloropropane	0.56	U Z	45.0	45.6		ug/Kg	☼	101	80 - 120		
2-Butanone (MEK)	1.8	U Z	45.0	43.5		ug/Kg	☼	97	69 - 124		
2-Hexanone	3.1	U Z	45.0	36.8		ug/Kg	☼	82	62 - 118		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-4 MS
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL88
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Methyl-2-pentanone (MIBK)	2.3	U Z	45.0	37.6		ug/Kg	☼	83	73 - 125
Acetone	6.0	U Z	45.0	40.1		ug/Kg	☼	89	54 - 139
Benzene	0.24	U Z	45.0	45.7		ug/Kg	☼	101	80 - 120
Bromodichloromethane	0.46	U Z	45.0	46.4		ug/Kg	☼	103	80 - 120
Bromoform	1.8	U Z	45.0	46.2		ug/Kg	☼	103	80 - 125
Bromomethane	2.2	U Z	45.0	43.9		ug/Kg	☼	97	70 - 126
Carbon disulfide	0.64	U Z	45.0	47.0		ug/Kg	☼	104	79 - 121
Carbon tetrachloride	0.47	U Z	45.0	48.0		ug/Kg	☼	107	80 - 120
Chlorobenzene	0.75	U Z	45.0	44.5		ug/Kg	☼	99	80 - 120
Chloroethane	1.8	U Z	45.0	42.4		ug/Kg	☼	94	64 - 133
Chloroform	0.35	U Z	45.0	45.9		ug/Kg	☼	102	80 - 120
Chloromethane	0.60	U Z	45.0	39.5		ug/Kg	☼	88	75 - 120
cis-1,3-Dichloropropene	1.9	U Z	45.0	49.2		ug/Kg	☼	109	80 - 120
Dibromochloromethane	1.1	U Z	45.0	46.0		ug/Kg	☼	102	80 - 120
Ethylbenzene	0.64	U Z	45.0	44.6		ug/Kg	☼	99	80 - 120
Methylene Chloride	1.5	U Z	45.0	46.1		ug/Kg	☼	102	77 - 123
Styrene	1.8	U Z	45.0	46.4		ug/Kg	☼	103	80 - 120
Tetrachloroethene	0.52	U Z	45.0	45.5		ug/Kg	☼	101	80 - 120
Toluene	2.3	U Z	45.0	46.4		ug/Kg	☼	103	80 - 124
trans-1,3-Dichloropropene	1.6	U Z	45.0	47.2		ug/Kg	☼	105	80 - 122
Trichloroethene	0.36	U Z	45.0	46.2		ug/Kg	☼	103	79 - 120
Vinyl chloride	0.40	U Z	45.0	42.9		ug/Kg	☼	95	71 - 120
Xylenes, Total	0.78	U Z T	90.1	96.1		ug/Kg	☼	107	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: 160-31841-4 MSD
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL88
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.40	U Z	39.3	42.6		ug/Kg	☼	109	80 - 120	14	20
1,1,2,2-Tetrachloroethane	1.8	U Z	39.3	40.6		ug/Kg	☼	104	78 - 120	7	20
1,1,2-Trichloroethane	1.1	U Z	39.3	40.7		ug/Kg	☼	104	80 - 120	5	20
1,1-Dichloroethane	0.36	U Z	39.3	40.9		ug/Kg	☼	104	80 - 120	11	20
1,1-Dichloroethene	1.5	U Z	39.3	40.9		ug/Kg	☼	104	78 - 121	14	20
1,2-Dichloroethane	0.80	U Z	39.3	40.4		ug/Kg	☼	103	78 - 117	13	20
1,2-Dichloroethene, Total	1.2	U Z	78.5	82.9		ug/Kg	☼	106	80 - 120	12	20
1,2-Dichloropropane	0.56	U Z	39.3	40.7		ug/Kg	☼	104	80 - 120	11	20
2-Butanone (MEK)	1.8	U Z	39.3	37.9		ug/Kg	☼	97	69 - 124	14	20
2-Hexanone	3.1	U Z	39.3	37.1		ug/Kg	☼	95	62 - 118	1	20
4-Methyl-2-pentanone (MIBK)	2.3	U Z	39.3	36.5		ug/Kg	☼	93	73 - 125	3	20
Acetone	6.0	U Z	39.3	38.2		ug/Kg	☼	97	54 - 139	5	20
Benzene	0.24	U Z	39.3	41.0		ug/Kg	☼	104	80 - 120	11	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-4 MSD
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL88
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.46	U Z	39.3	41.5		ug/Kg	☼	106	80 - 120	11	20
Bromoform	1.8	U Z	39.3	43.1		ug/Kg	☼	110	80 - 125	7	20
Bromomethane	2.2	U Z	39.3	38.9		ug/Kg	☼	99	70 - 126	12	20
Carbon disulfide	0.64	U Z	39.3	40.9		ug/Kg	☼	104	79 - 121	14	20
Carbon tetrachloride	0.47	U Z	39.3	41.2		ug/Kg	☼	105	80 - 120	15	20
Chlorobenzene	0.75	U Z	39.3	40.8		ug/Kg	☼	104	80 - 120	9	20
Chloroethane	1.8	U Z	39.3	37.7		ug/Kg	☼	96	64 - 133	12	20
Chloroform	0.35	U Z	39.3	40.2		ug/Kg	☼	103	80 - 120	13	20
Chloromethane	0.60	U Z	39.3	35.6		ug/Kg	☼	91	75 - 120	10	20
cis-1,3-Dichloropropene	1.9	U Z	39.3	43.7		ug/Kg	☼	111	80 - 120	12	20
Dibromochloromethane	1.1	U Z	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U Z	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U Z	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U Z	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U Z	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U Z	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U Z	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U Z	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U Z	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U Z T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401099/1-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31841-1
SDG: SL31841-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31841-1	B3KLB6	125	101	115	100
160-31841-2	B3KL87	91	42 X	70	45 X
160-31841-3	B3KLB1	134 X	107	120	105
160-31841-4	B3KL88	104	93	101	98
160-31841-4 MS	B3KL88	102	99	105	101
160-31841-4 MSD	B3KL88	103	101	106	106
160-31841-5	B3KLB2	142 X	105	120	105
160-31841-6	B3KLC2	200 X	149	138	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-402637/5	Lab Control Sample	120	98	112	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-402637/6	Lab Control Sample Dup	127	102	115	105
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-402637/10	Method Blank	126	103	114	102
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31841-1	B3KLB6	83	87	80	81	73	87
160-31841-1 MS	B3KLB6	84	84	81	83	78	85
160-31841-1 MSD	B3KLB6	90	87	82	86	79	90
160-31841-2	B3KL87	76	77	76	74	69	78
160-31841-3	B3KLB1	77	84	84	82	79	79
160-31841-4	B3KL88	81	85	83	79	76	82
160-31841-5	B3KLB2	78	87	87	83	84	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-402637/10
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			11/26/18 14:14	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			11/26/18 14:14	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			11/26/18 14:14	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			11/26/18 14:14	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			11/26/18 14:14	1
Acetone	6.5	U	20	6.5	ug/Kg			11/26/18 14:14	1
Benzene	0.26	U	5.0	0.26	ug/Kg			11/26/18 14:14	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			11/26/18 14:14	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			11/26/18 14:14	1
Bromomethane	2.4	U	10	2.4	ug/Kg			11/26/18 14:14	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			11/26/18 14:14	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			11/26/18 14:14	1
Chloroethane	2.0	U	10	2.0	ug/Kg			11/26/18 14:14	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			11/26/18 14:14	1
Chloromethane	0.65	U	10	0.65	ug/Kg			11/26/18 14:14	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			11/26/18 14:14	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
Styrene	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			11/26/18 14:14	1
Toluene	2.5	U	5.0	2.5	ug/Kg			11/26/18 14:14	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			11/26/18 14:14	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*11/26/18 14:14*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*126*		*67 - 132*		*11/26/18 14:14*	*1*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*		*11/26/18 14:14*	*1*
Dibromofluoromethane (Surr)	*114*		*53 - 143*		*11/26/18 14:14*	*1*
Toluene-d8 (Surr)	*102*		*74 - 135*		*11/26/18 14:14*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-402637/5
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	61.0		ug/Kg		122	71 - 127
1,1,2,2-Tetrachloroethane	50.0	36.5		ug/Kg		73	52 - 140
1,1,2-Trichloroethane	50.0	46.7		ug/Kg		93	79 - 122
1,1-Dichloroethane	50.0	54.2		ug/Kg		108	80 - 120
1,1-Dichloroethene	50.0	46.5		ug/Kg		93	71 - 126
1,2-Dichloroethane	50.0	61.6		ug/Kg		123	68 - 128
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121
1,2-Dichloropropane	50.0	49.4		ug/Kg		99	80 - 126
2-Butanone (MEK)	50.0	44.8		ug/Kg		90	41 - 140
2-Hexanone	50.0	38.5		ug/Kg		77	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	44.1		ug/Kg		88	67 - 130
Acetone	50.0	50.3		ug/Kg		101	39 - 140
Benzene	50.0	51.3		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	59.0		ug/Kg		118	78 - 124
Bromoform	50.0	48.1		ug/Kg		96	67 - 135
Bromomethane	50.0	83.7	o	ug/Kg		167	61 - 132
Carbon disulfide	50.0	46.7		ug/Kg		93	74 - 124
Carbon tetrachloride	50.0	57.7		ug/Kg		115	68 - 130
Chlorobenzene	50.0	53.5		ug/Kg		107	80 - 120
Chloroethane	50.0	77.5	o	ug/Kg		155	73 - 129
Chloroform	50.0	56.0		ug/Kg		112	78 - 120
Chloromethane	50.0	43.1		ug/Kg		86	69 - 123
cis-1,3-Dichloropropene	50.0	57.9		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	56.8		ug/Kg		114	77 - 126
Ethylbenzene	50.0	54.9		ug/Kg		110	79 - 126
Methylene Chloride	50.0	47.3		ug/Kg		95	76 - 120
Styrene	50.0	55.0		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	55.4		ug/Kg		111	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136
Trichloroethene	50.0	55.5		ug/Kg		111	66 - 130
Vinyl chloride	50.0	48.5		ug/Kg		97	56 - 134
Xylenes, Total	100	112		ug/Kg		112	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*120*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*112*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.9		ug/Kg		114	71 - 127	7	20
1,1,2,2-Tetrachloroethane	50.0	39.6		ug/Kg		79	52 - 140	8	20
1,1,2-Trichloroethane	50.0	48.1		ug/Kg		96	79 - 122	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	54.4		ug/Kg		109	80 - 120	1	20
1,1-Dichloroethene	50.0	43.4		ug/Kg		87	71 - 126	7	20
1,2-Dichloroethane	50.0	63.2		ug/Kg		126	68 - 128	3	20
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121	0	20
1,2-Dichloropropane	50.0	50.3		ug/Kg		101	80 - 126	2	20
2-Butanone (MEK)	50.0	46.8		ug/Kg		94	41 - 140	4	20
2-Hexanone	50.0	45.1		ug/Kg		90	63 - 136	16	20
4-Methyl-2-pentanone (MIBK)	50.0	46.1		ug/Kg		92	67 - 130	4	20
Acetone	50.0	52.7		ug/Kg		105	39 - 140	5	20
Benzene	50.0	51.8		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	61.2		ug/Kg		122	78 - 124	4	20
Bromoform	50.0	49.8		ug/Kg		100	67 - 135	4	20
Bromomethane	50.0	75.3	o	ug/Kg		151	61 - 132	11	20
Carbon disulfide	50.0	51.9		ug/Kg		104	74 - 124	11	20
Carbon tetrachloride	50.0	59.4		ug/Kg		119	68 - 130	3	20
Chlorobenzene	50.0	53.2		ug/Kg		106	80 - 120	1	20
Chloroethane	50.0	72.2	o	ug/Kg		144	73 - 129	7	20
Chloroform	50.0	57.0		ug/Kg		114	78 - 120	2	20
Chloromethane	50.0	41.4		ug/Kg		83	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	60.6		ug/Kg		121	78 - 127	5	20
Dibromochloromethane	50.0	58.0		ug/Kg		116	77 - 126	2	20
Ethylbenzene	50.0	54.0		ug/Kg		108	79 - 126	2	20
Methylene Chloride	50.0	47.5		ug/Kg		95	76 - 120	0	20
Styrene	50.0	53.6		ug/Kg		107	80 - 129	3	20
Tetrachloroethene	50.0	54.4		ug/Kg		109	76 - 126	2	20
Toluene	50.0	52.9		ug/Kg		106	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136	0	20
Trichloroethene	50.0	55.1		ug/Kg		110	66 - 130	1	20
Vinyl chloride	50.0	48.4		ug/Kg		97	56 - 134	0	20
Xylenes, Total	100	109		ug/Kg		109	79 - 132	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*127*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*115*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/26/18 07:01	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/26/18 07:01	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/26/18 07:01	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/26/18 07:01	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/26/18 07:01	1
Acetone	6.5	U	20	6.5	ug/Kg			12/26/18 07:01	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/26/18 07:01	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/26/18 07:01	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/26/18 07:01	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/26/18 07:01	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/26/18 07:01	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/26/18 07:01	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/26/18 07:01	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/26/18 07:01	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/26/18 07:01	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/26/18 07:01	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/26/18 07:01	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/26/18 07:01	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/26/18 07:01	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/26/18 07:01*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*		*12/26/18 07:01*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 150*		*12/26/18 07:01*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/26/18 07:01*	*1*
Toluene-d8 (Surr)	*100*		*74 - 135*		*12/26/18 07:01*	*1*

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.9		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	49.0		ug/Kg		98	52 - 140
1,1,2-Trichloroethane	50.0	49.0		ug/Kg		98	79 - 122
1,1-Dichloroethane	50.0	50.4		ug/Kg		101	80 - 120

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126
1,2-Dichloroethane	50.0	47.8		ug/Kg		96	68 - 128
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121
1,2-Dichloropropane	50.0	51.3		ug/Kg		103	80 - 126
2-Butanone (MEK)	50.0	46.0		ug/Kg		92	41 - 140
2-Hexanone	50.0	43.2		ug/Kg		86	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	43.4		ug/Kg		87	39 - 140
Benzene	50.0	52.1		ug/Kg		104	80 - 120
Bromodichloromethane	50.0	49.6		ug/Kg		99	78 - 124
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	50.7		ug/Kg		101	61 - 132
Carbon disulfide	50.0	53.0		ug/Kg		106	74 - 124
Carbon tetrachloride	50.0	51.1		ug/Kg		102	68 - 130
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120
Chloroethane	50.0	48.1		ug/Kg		96	73 - 129
Chloroform	50.0	49.1		ug/Kg		98	78 - 120
Chloromethane	50.0	45.4		ug/Kg		91	69 - 123
cis-1,3-Dichloropropene	50.0	54.3		ug/Kg		109	78 - 127
Dibromochloromethane	50.0	50.3		ug/Kg		101	77 - 126
Ethylbenzene	50.0	51.4		ug/Kg		103	79 - 126
Methylene Chloride	50.0	51.6		ug/Kg		103	76 - 120
Styrene	50.0	54.2		ug/Kg		108	80 - 129
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	52.7		ug/Kg		105	77 - 136
Trichloroethene	50.0	50.5		ug/Kg		101	66 - 130
Vinyl chloride	50.0	53.8		ug/Kg		108	56 - 134
Xylenes, Total	100	114		ug/Kg		114	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	52.8		ug/Kg		106	52 - 140	7	20
1,1,2-Trichloroethane	50.0	50.9		ug/Kg		102	79 - 122	4	20
1,1-Dichloroethane	50.0	51.0		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	53.0		ug/Kg		106	71 - 126	1	20
1,2-Dichloroethane	50.0	48.5		ug/Kg		97	68 - 128	2	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane			50.0	52.3		ug/Kg		105	80 - 126	2	20
2-Butanone (MEK)			50.0	50.7		ug/Kg		101	41 - 140	10	20
2-Hexanone			50.0	48.7		ug/Kg		97	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)			50.0	46.4		ug/Kg		93	67 - 130	7	20
Acetone			50.0	47.0		ug/Kg		94	39 - 140	8	20
Benzene			50.0	52.1		ug/Kg		104	80 - 120	0	20
Bromodichloromethane			50.0	50.8		ug/Kg		102	78 - 124	2	20
Bromoform			50.0	52.8		ug/Kg		106	67 - 135	8	20
Bromomethane			50.0	50.2		ug/Kg		100	61 - 132	1	20
Carbon disulfide			50.0	52.8		ug/Kg		106	74 - 124	0	20
Carbon tetrachloride			50.0	50.9		ug/Kg		102	68 - 130	0	20
Chlorobenzene			50.0	51.9		ug/Kg		104	80 - 120	0	20
Chloroethane			50.0	46.2		ug/Kg		92	73 - 129	4	20
Chloroform			50.0	49.8		ug/Kg		100	78 - 120	2	20
Chloromethane			50.0	45.1		ug/Kg		90	69 - 123	1	20
cis-1,3-Dichloropropene			50.0	55.7		ug/Kg		111	78 - 127	3	20
Dibromochloromethane			50.0	52.9		ug/Kg		106	77 - 126	5	20
Ethylbenzene			50.0	51.9		ug/Kg		104	79 - 126	1	20
Methylene Chloride			50.0	52.2		ug/Kg		104	76 - 120	1	20
Styrene			50.0	55.0		ug/Kg		110	80 - 129	2	20
Tetrachloroethene			50.0	51.6		ug/Kg		103	76 - 126	1	20
Toluene			50.0	54.8		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene			50.0	55.1		ug/Kg		110	77 - 136	4	20
Trichloroethene			50.0	50.3		ug/Kg		101	66 - 130	0	20
Vinyl chloride			50.0	51.6		ug/Kg		103	56 - 134	4	20
Xylenes, Total			100	114		ug/Kg		114	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-31884-10 MS
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane	0.45	U Z	45.3	48.8		ug/Kg	☼	108	80 - 120		
1,1,2,2-Tetrachloroethane	2.1	U Z	45.3	52.0		ug/Kg	☼	115	78 - 120		
1,1,2-Trichloroethane	1.2	U Z	45.3	50.4		ug/Kg	☼	111	80 - 120		
1,1-Dichloroethane	0.41	U Z	45.3	47.8		ug/Kg	☼	105	80 - 120		
1,1-Dichloroethene	1.7	U Z	45.3	48.3		ug/Kg	☼	107	78 - 121		
1,2-Dichloroethane	0.92	U Z	45.3	47.4		ug/Kg	☼	105	78 - 117		
1,2-Dichloroethene, Total	1.4	U Z	90.6	96.9		ug/Kg	☼	107	80 - 120		
1,2-Dichloropropane	0.63	U Z	45.3	48.2		ug/Kg	☼	106	80 - 120		
2-Butanone (MEK)	2.0	U Z	45.3	47.0		ug/Kg	☼	104	69 - 124		
2-Hexanone	3.5	U Z	45.3	46.9		ug/Kg	☼	104	62 - 118		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31884-10 MS — **Client Sample ID: B3KL92**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407502 — **Prep Batch: 407503**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Methyl-2-pentanone (MIBK)	2.7	U Z	45.3	46.0		ug/Kg	☼	102	73 - 125
Acetone	6.8	U Z	45.3	50.0		ug/Kg	☼	110	54 - 139
Benzene	0.27	U Z	45.3	47.9		ug/Kg	☼	106	80 - 120
Bromodichloromethane	0.52	U Z	45.3	48.7		ug/Kg	☼	107	80 - 120
Bromoform	2.0	U Z T	45.3	57.2	T	ug/Kg	☼	126	80 - 125
Bromomethane	2.5	U Z	45.3	44.6		ug/Kg	☼	98	70 - 126
Carbon disulfide	0.73	U Z	45.3	47.2		ug/Kg	☼	104	79 - 121
Carbon tetrachloride	0.54	U Z	45.3	47.7		ug/Kg	☼	105	80 - 120
Chlorobenzene	0.85	U Z	45.3	49.2		ug/Kg	☼	109	80 - 120
Chloroethane	2.1	U Z	45.3	42.6		ug/Kg	☼	94	64 - 133
Chloroform	0.40	U Z	45.3	47.4		ug/Kg	☼	105	80 - 120
Chloromethane	0.68	U Z	45.3	40.8		ug/Kg	☼	90	75 - 120
cis-1,3-Dichloropropene	2.2	U Z	45.3	50.7		ug/Kg	☼	112	80 - 120
Dibromochloromethane	1.3	U Z	45.3	52.7		ug/Kg	☼	116	80 - 120
Ethylbenzene	0.73	U Z	45.3	48.5		ug/Kg	☼	107	80 - 120
Methylene Chloride	1.7	U Z	45.3	48.4		ug/Kg	☼	107	77 - 123
Styrene	2.1	U Z	45.3	51.0		ug/Kg	☼	112	80 - 120
Tetrachloroethene	0.59	U Z	45.3	46.2		ug/Kg	☼	102	80 - 120
Toluene	2.6	U Z	45.3	51.1		ug/Kg	☼	113	80 - 124
trans-1,3-Dichloropropene	1.8	U Z	45.3	53.7		ug/Kg	☼	118	80 - 122
Trichloroethene	0.41	U Z	45.3	49.0		ug/Kg	☼	108	79 - 120
Vinyl chloride	0.45	U Z	45.3	46.7		ug/Kg	☼	103	71 - 120
Xylenes, Total	0.89	U Z	90.6	105		ug/Kg	☼	116	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*109*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*108*		*74 - 135*

Lab Sample ID: 160-31884-10 MSD — **Client Sample ID: B3KL92**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407502 — **Prep Batch: 407503**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.45	U Z	46.2	48.6		ug/Kg	☼	105	80 - 120	0	20
1,1,2,2-Tetrachloroethane	2.1	U Z	46.2	52.2		ug/Kg	☼	113	78 - 120	0	20
1,1,2-Trichloroethane	1.2	U Z	46.2	51.3		ug/Kg	☼	111	80 - 120	2	20
1,1-Dichloroethane	0.41	U Z	46.2	47.1		ug/Kg	☼	102	80 - 120	1	20
1,1-Dichloroethene	1.7	U Z	46.2	47.5		ug/Kg	☼	103	78 - 121	2	20
1,2-Dichloroethane	0.92	U Z	46.2	48.9		ug/Kg	☼	106	78 - 117	3	20
1,2-Dichloroethene, Total	1.4	U Z	92.3	96.8		ug/Kg	☼	105	80 - 120	0	20
1,2-Dichloropropane	0.63	U Z	46.2	48.9		ug/Kg	☼	106	80 - 120	1	20
2-Butanone (MEK)	2.0	U Z	46.2	50.8		ug/Kg	☼	110	69 - 124	8	20
2-Hexanone	3.5	U Z	46.2	50.5		ug/Kg	☼	109	62 - 118	7	20
4-Methyl-2-pentanone (MIBK)	2.7	U Z	46.2	49.8		ug/Kg	☼	108	73 - 125	8	20
Acetone	6.8	U Z	46.2	57.0		ug/Kg	☼	123	54 - 139	13	20
Benzene	0.27	U Z	46.2	48.3		ug/Kg	☼	105	80 - 120	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31884-10 MSD
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.52	U Z	46.2	49.7		ug/Kg	☼	108	80 - 120	2	20
Bromoform	2.0	U Z T	46.2	57.0		ug/Kg	☼	123	80 - 125	0	20
Bromomethane	2.5	U Z	46.2	45.5		ug/Kg	☼	99	70 - 126	2	20
Carbon disulfide	0.73	U Z	46.2	47.4		ug/Kg	☼	103	79 - 121	0	20
Carbon tetrachloride	0.54	U Z	46.2	47.4		ug/Kg	☼	103	80 - 120	1	20
Chlorobenzene	0.85	U Z	46.2	49.2		ug/Kg	☼	107	80 - 120	0	20
Chloroethane	2.1	U Z	46.2	42.0		ug/Kg	☼	91	64 - 133	1	20
Chloroform	0.40	U Z	46.2	47.4		ug/Kg	☼	103	80 - 120	0	20
Chloromethane	0.68	U Z	46.2	41.8		ug/Kg	☼	91	75 - 120	2	20
cis-1,3-Dichloropropene	2.2	U Z	46.2	53.1		ug/Kg	☼	115	80 - 120	5	20
Dibromochloromethane	1.3	U Z	46.2	53.8		ug/Kg	☼	117	80 - 120	2	20
Ethylbenzene	0.73	U Z	46.2	47.6		ug/Kg	☼	103	80 - 120	2	20
Methylene Chloride	1.7	U Z	46.2	48.8		ug/Kg	☼	106	77 - 123	1	20
Styrene	2.1	U Z	46.2	50.7		ug/Kg	☼	110	80 - 120	0	20
Tetrachloroethene	0.59	U Z	46.2	47.1		ug/Kg	☼	102	80 - 120	2	20
Toluene	2.6	U Z	46.2	51.2		ug/Kg	☼	111	80 - 124	0	20
trans-1,3-Dichloropropene	1.8	U Z	46.2	55.0		ug/Kg	☼	119	80 - 122	2	20
Trichloroethene	0.41	U Z	46.2	49.8		ug/Kg	☼	108	79 - 120	2	20
Vinyl chloride	0.45	U Z	46.2	45.7		ug/Kg	☼	99	71 - 120	2	20
Xylenes, Total	0.89	U Z	92.3	105		ug/Kg	☼	113	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*104*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31884-10	B3KL92	104	106	103	104
160-31884-10 MS	B3KL92	103	109	105	108
160-31884-10 MSD	B3KL92	107	106	104	106
160-31884-11	B3KL94	146 X	108	121	104
160-31884-12	B3KL89	147 X	108	123	109
160-31884-13	B3KL98	164 X	113	144 X	101
160-31884-14	B3KLB7	156 X	105	126	101
160-31884-15	B3KL97	147 X	108	119	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-402637/5	Lab Control Sample	120	98	112	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-402637/6	Lab Control Sample Dup	127	102	115	105
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-402637/10	Method Blank	126	103	114	102
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31884-10 - DL	B3KL92	66	76	71	68	73	84
160-31884-10 MS - DL	B3KL92	64	72	70	65	70	85
160-31884-10 MSD - DL	B3KL92	57	77	76	73	75	87
160-31884-11 - DL	B3KL94	58	76	71	59	73	90
160-31884-12 - DL	B3KL89	57	80	78	69	81	90
160-31884-13 - DL	B3KL98	53	78	75	63	72	93
160-31884-14 - DL	B3KLB7	63	79	79	65	80	89
160-31884-15 - DL	B3KL97	60	74	63	59	68	85

Surrogate Legend

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-402637/10
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			11/26/18 14:14	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			11/26/18 14:14	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			11/26/18 14:14	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			11/26/18 14:14	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			11/26/18 14:14	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			11/26/18 14:14	1
Acetone	6.5	U	20	6.5	ug/Kg			11/26/18 14:14	1
Benzene	0.26	U	5.0	0.26	ug/Kg			11/26/18 14:14	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			11/26/18 14:14	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			11/26/18 14:14	1
Bromomethane	2.4	U	10	2.4	ug/Kg			11/26/18 14:14	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			11/26/18 14:14	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			11/26/18 14:14	1
Chloroethane	2.0	U	10	2.0	ug/Kg			11/26/18 14:14	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			11/26/18 14:14	1
Chloromethane	0.65	U	10	0.65	ug/Kg			11/26/18 14:14	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			11/26/18 14:14	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			11/26/18 14:14	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			11/26/18 14:14	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			11/26/18 14:14	1
Styrene	2.0	U	5.0	2.0	ug/Kg			11/26/18 14:14	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			11/26/18 14:14	1
Toluene	2.5	U	5.0	2.5	ug/Kg			11/26/18 14:14	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			11/26/18 14:14	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			11/26/18 14:14	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			11/26/18 14:14	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			11/26/18 14:14	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*11/26/18 14:14*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*126*		*67 - 132*		*11/26/18 14:14*	*1*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*		*11/26/18 14:14*	*1*
Dibromofluoromethane (Surr)	*114*		*53 - 143*		*11/26/18 14:14*	*1*
Toluene-d8 (Surr)	*102*		*74 - 135*		*11/26/18 14:14*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-402637/5
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	61.0		ug/Kg		122	71 - 127
1,1,2,2-Tetrachloroethane	50.0	36.5		ug/Kg		73	52 - 140
1,1,2-Trichloroethane	50.0	46.7		ug/Kg		93	79 - 122
1,1-Dichloroethane	50.0	54.2		ug/Kg		108	80 - 120
1,1-Dichloroethene	50.0	46.5		ug/Kg		93	71 - 126
1,2-Dichloroethane	50.0	61.6		ug/Kg		123	68 - 128
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121
1,2-Dichloropropane	50.0	49.4		ug/Kg		99	80 - 126
2-Butanone (MEK)	50.0	44.8		ug/Kg		90	41 - 140
2-Hexanone	50.0	38.5		ug/Kg		77	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	44.1		ug/Kg		88	67 - 130
Acetone	50.0	50.3		ug/Kg		101	39 - 140
Benzene	50.0	51.3		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	59.0		ug/Kg		118	78 - 124
Bromoform	50.0	48.1		ug/Kg		96	67 - 135
Bromomethane	50.0	83.7	o	ug/Kg		167	61 - 132
Carbon disulfide	50.0	46.7		ug/Kg		93	74 - 124
Carbon tetrachloride	50.0	57.7		ug/Kg		115	68 - 130
Chlorobenzene	50.0	53.5		ug/Kg		107	80 - 120
Chloroethane	50.0	77.5	o	ug/Kg		155	73 - 129
Chloroform	50.0	56.0		ug/Kg		112	78 - 120
Chloromethane	50.0	43.1		ug/Kg		86	69 - 123
cis-1,3-Dichloropropene	50.0	57.9		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	56.8		ug/Kg		114	77 - 126
Ethylbenzene	50.0	54.9		ug/Kg		110	79 - 126
Methylene Chloride	50.0	47.3		ug/Kg		95	76 - 120
Styrene	50.0	55.0		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	55.4		ug/Kg		111	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136
Trichloroethene	50.0	55.5		ug/Kg		111	66 - 130
Vinyl chloride	50.0	48.5		ug/Kg		97	56 - 134
Xylenes, Total	100	112		ug/Kg		112	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*120*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*112*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.9		ug/Kg		114	71 - 127	7	20
1,1,2,2-Tetrachloroethane	50.0	39.6		ug/Kg		79	52 - 140	8	20
1,1,2-Trichloroethane	50.0	48.1		ug/Kg		96	79 - 122	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-402637/6
Matrix: Solid
Analysis Batch: 402637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	54.4		ug/Kg		109	80 - 120	1	20
1,1-Dichloroethene	50.0	43.4		ug/Kg		87	71 - 126	7	20
1,2-Dichloroethane	50.0	63.2		ug/Kg		126	68 - 128	3	20
1,2-Dichloroethene, Total	100	106		ug/Kg		106	79 - 121	0	20
1,2-Dichloropropane	50.0	50.3		ug/Kg		101	80 - 126	2	20
2-Butanone (MEK)	50.0	46.8		ug/Kg		94	41 - 140	4	20
2-Hexanone	50.0	45.1		ug/Kg		90	63 - 136	16	20
4-Methyl-2-pentanone (MIBK)	50.0	46.1		ug/Kg		92	67 - 130	4	20
Acetone	50.0	52.7		ug/Kg		105	39 - 140	5	20
Benzene	50.0	51.8		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	61.2		ug/Kg		122	78 - 124	4	20
Bromoform	50.0	49.8		ug/Kg		100	67 - 135	4	20
Bromomethane	50.0	75.3	o	ug/Kg		151	61 - 132	11	20
Carbon disulfide	50.0	51.9		ug/Kg		104	74 - 124	11	20
Carbon tetrachloride	50.0	59.4		ug/Kg		119	68 - 130	3	20
Chlorobenzene	50.0	53.2		ug/Kg		106	80 - 120	1	20
Chloroethane	50.0	72.2	o	ug/Kg		144	73 - 129	7	20
Chloroform	50.0	57.0		ug/Kg		114	78 - 120	2	20
Chloromethane	50.0	41.4		ug/Kg		83	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	60.6		ug/Kg		121	78 - 127	5	20
Dibromochloromethane	50.0	58.0		ug/Kg		116	77 - 126	2	20
Ethylbenzene	50.0	54.0		ug/Kg		108	79 - 126	2	20
Methylene Chloride	50.0	47.5		ug/Kg		95	76 - 120	0	20
Styrene	50.0	53.6		ug/Kg		107	80 - 129	3	20
Tetrachloroethene	50.0	54.4		ug/Kg		109	76 - 126	2	20
Toluene	50.0	52.9		ug/Kg		106	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	58.4		ug/Kg		117	77 - 136	0	20
Trichloroethene	50.0	55.1		ug/Kg		110	66 - 130	1	20
Vinyl chloride	50.0	48.4		ug/Kg		97	56 - 134	0	20
Xylenes, Total	100	109		ug/Kg		109	79 - 132	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*127*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*115*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: MB 160-403184/1-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403184

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg		11/28/18 12:00	11/28/18 15:11	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-403184/1-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403184

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
2-Hexanone	3.4	U	20	3.4	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Acetone	6.5	U	20	6.5	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Benzene	0.26	U	5.0	0.26	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Bromoform	1.9	U	5.0	1.9	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Bromomethane	2.4	U	10	2.4	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Chloroethane	2.0	U	10	2.0	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Chloroform	0.38	U	5.0	0.38	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Chloromethane	0.65	U	10	0.65	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Styrene	2.0	U	5.0	2.0	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Toluene	2.5	U	5.0	2.5	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg		11/28/18 12:00	11/28/18 15:11	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg		11/28/18 12:00	11/28/18 15:11	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*11/28/18 12:00*	*11/28/18 15:11*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*129*		*67 - 132*	*11/28/18 12:00*	*11/28/18 15:11*	*1*
4-Bromofluorobenzene (Surr)	*93*		*59 - 150*	*11/28/18 12:00*	*11/28/18 15:11*	*1*
Dibromofluoromethane (Surr)	*115*		*53 - 143*	*11/28/18 12:00*	*11/28/18 15:11*	*1*
Toluene-d8 (Surr)	*99*		*74 - 135*	*11/28/18 12:00*	*11/28/18 15:11*	*1*

Lab Sample ID: LCS 160-403184/2-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403184

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	58.1		ug/Kg		116	71 - 127
1,1,2,2-Tetrachloroethane	50.0	38.0		ug/Kg		76	52 - 140
1,1,2-Trichloroethane	50.0	45.4		ug/Kg		91	79 - 122
1,1-Dichloroethane	50.0	51.9		ug/Kg		104	80 - 120

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-403184/2-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403184

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	37.9		ug/Kg		76	71 - 126
1,2-Dichloroethane	50.0	65.0	o	ug/Kg		130	68 - 128
1,2-Dichloroethene, Total	100	99.1		ug/Kg		99	79 - 121
1,2-Dichloropropane	50.0	48.6		ug/Kg		97	80 - 126
2-Butanone (MEK)	50.0	49.5		ug/Kg		99	41 - 140
2-Hexanone	50.0	40.2		ug/Kg		80	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.9		ug/Kg		88	67 - 130
Acetone	50.0	54.2		ug/Kg		108	39 - 140
Benzene	50.0	50.0		ug/Kg		100	80 - 120
Bromodichloromethane	50.0	61.0		ug/Kg		122	78 - 124
Bromoform	50.0	45.5		ug/Kg		91	67 - 135
Bromomethane	50.0	80.8	o	ug/Kg		162	61 - 132
Carbon disulfide	50.0	43.1		ug/Kg		86	74 - 124
Carbon tetrachloride	50.0	56.0		ug/Kg		112	68 - 130
Chlorobenzene	50.0	50.7		ug/Kg		101	80 - 120
Chloroethane	50.0	62.2		ug/Kg		124	73 - 129
Chloroform	50.0	55.5		ug/Kg		111	78 - 120
Chloromethane	50.0	42.3		ug/Kg		85	69 - 123
cis-1,3-Dichloropropene	50.0	57.6		ug/Kg		115	78 - 127
Dibromochloromethane	50.0	53.2		ug/Kg		106	77 - 126
Ethylbenzene	50.0	51.7		ug/Kg		103	79 - 126
Methylene Chloride	50.0	42.4		ug/Kg		85	76 - 120
Styrene	50.0	52.5		ug/Kg		105	80 - 129
Tetrachloroethene	50.0	51.1		ug/Kg		102	76 - 126
Toluene	50.0	50.5		ug/Kg		101	76 - 136
trans-1,3-Dichloropropene	50.0	53.8		ug/Kg		108	77 - 136
Trichloroethene	50.0	54.4		ug/Kg		109	66 - 130
Vinyl chloride	50.0	48.3		ug/Kg		97	56 - 134
Xylenes, Total	100	104		ug/Kg		104	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*133*	*X*	*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*115*		*53 - 143*
Toluene-d8 (Surr)	*98*		*74 - 135*

Lab Sample ID: LCSD 160-403184/3-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 403184

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	58.0		ug/Kg		116	71 - 127	0	20
1,1,2,2-Tetrachloroethane	50.0	38.1		ug/Kg		76	52 - 140	0	20
1,1,2-Trichloroethane	50.0	45.5		ug/Kg		91	79 - 122	0	20
1,1-Dichloroethane	50.0	51.5		ug/Kg		103	80 - 120	1	20
1,1-Dichloroethene	50.0	40.5		ug/Kg		81	71 - 126	7	20
1,2-Dichloroethane	50.0	62.9		ug/Kg		126	68 - 128	3	20
1,2-Dichloroethene, Total	100	97.2		ug/Kg		97	79 - 121	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-403184/3-A
Matrix: Solid
Analysis Batch: 403177

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 403184

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	50.0	49.0		ug/Kg		98	80 - 126	1	20
2-Butanone (MEK)	50.0	46.5		ug/Kg		93	41 - 140	6	20
2-Hexanone	50.0	39.8		ug/Kg		80	63 - 136	1	20
4-Methyl-2-pentanone (MIBK)	50.0	44.4		ug/Kg		89	67 - 130	1	20
Acetone	50.0	53.5		ug/Kg		107	39 - 140	1	20
Benzene	50.0	49.3		ug/Kg		99	80 - 120	1	20
Bromodichloromethane	50.0	60.8		ug/Kg		122	78 - 124	0	20
Bromoform	50.0	45.8		ug/Kg		92	67 - 135	1	20
Bromomethane	50.0	86.2	o	ug/Kg		172	61 - 132	7	20
Carbon disulfide	50.0	44.0		ug/Kg		88	74 - 124	2	20
Carbon tetrachloride	50.0	54.0		ug/Kg		108	68 - 130	4	20
Chlorobenzene	50.0	50.8		ug/Kg		102	80 - 120	0	20
Chloroethane	50.0	73.6	o	ug/Kg		147	73 - 129	17	20
Chloroform	50.0	54.8		ug/Kg		110	78 - 120	1	20
Chloromethane	50.0	39.0		ug/Kg		78	69 - 123	8	20
cis-1,3-Dichloropropene	50.0	57.0		ug/Kg		114	78 - 127	1	20
Dibromochloromethane	50.0	53.5		ug/Kg		107	77 - 126	1	20
Ethylbenzene	50.0	52.2		ug/Kg		104	79 - 126	1	20
Methylene Chloride	50.0	45.3		ug/Kg		91	76 - 120	7	20
Styrene	50.0	52.3		ug/Kg		105	80 - 129	0	20
Tetrachloroethene	50.0	50.9		ug/Kg		102	76 - 126	0	20
Toluene	50.0	50.1		ug/Kg		100	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	54.8		ug/Kg		110	77 - 136	2	20
Trichloroethene	50.0	53.5		ug/Kg		107	66 - 130	2	20
Vinyl chloride	50.0	43.7		ug/Kg		87	56 - 134	10	20
Xylenes, Total	100	105		ug/Kg		105	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*123*		*67 - 132*
4-Bromofluorobenzene (Surr)	*94*		*59 - 150*
Dibromofluoromethane (Surr)	*113*		*53 - 143*
Toluene-d8 (Surr)	*98*		*74 - 135*

Lab Sample ID: MB 160-405938/1-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405938

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg		12/15/18 12:00	12/15/18 14:09	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-405938/1-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405938

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	3.4	U	20	3.4	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Acetone	6.5	U	20	6.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Benzene	0.26	U	5.0	0.26	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromoform	1.9	U	5.0	1.9	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromomethane	2.4	U	10	2.4	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloroethane	2.0	U	10	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloroform	0.38	U	5.0	0.38	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloromethane	0.65	U	10	0.65	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Methylene Chloride	3.89	J	5.0	1.6	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Styrene	2.0	U	5.0	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Toluene	2.5	U	5.0	2.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg		12/15/18 12:00	12/15/18 14:09	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*12/15/18 12:00*	*12/15/18 14:09*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
Dibromofluoromethane (Surr)	*96*		*53 - 143*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
Toluene-d8 (Surr)	*101*		*74 - 135*	*12/15/18 12:00*	*12/15/18 14:09*	*1*

Lab Sample ID: LCS 160-405938/2-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	44.2		ug/Kg		88	71 - 127
1,1,2,2-Tetrachloroethane	50.0	53.4		ug/Kg		107	52 - 140
1,1,2-Trichloroethane	50.0	52.0		ug/Kg		104	79 - 122
1,1-Dichloroethane	50.0	48.4		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	50.5		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	43.6		ug/Kg		87	68 - 128
1,2-Dichloroethene, Total	100	108		ug/Kg		108	79 - 121
1,2-Dichloropropane	50.0	55.0		ug/Kg		110	80 - 126

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405938/2-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Butanone (MEK)	50.0	54.4		ug/Kg		109	41 - 140
2-Hexanone	50.0	48.9		ug/Kg		98	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	47.8		ug/Kg		96	67 - 130
Acetone	50.0	42.8		ug/Kg		86	39 - 140
Benzene	50.0	50.4		ug/Kg		101	80 - 120
Bromodichloromethane	50.0	47.8		ug/Kg		96	78 - 124
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	37.5		ug/Kg		75	61 - 132
Carbon disulfide	50.0	48.7		ug/Kg		97	74 - 124
Carbon tetrachloride	50.0	42.9		ug/Kg		86	68 - 130
Chlorobenzene	50.0	49.8		ug/Kg		100	80 - 120
Chloroethane	50.0	31.8	o	ug/Kg		64	73 - 129
Chloroform	50.0	44.8		ug/Kg		90	78 - 120
Chloromethane	50.0	39.6		ug/Kg		79	69 - 123
cis-1,3-Dichloropropene	50.0	56.5		ug/Kg		113	78 - 127
Dibromochloromethane	50.0	49.7		ug/Kg		99	77 - 126
Ethylbenzene	50.0	47.8		ug/Kg		96	79 - 126
Methylene Chloride	50.0	56.7	B	ug/Kg		113	76 - 120
Styrene	50.0	54.9		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	48.9		ug/Kg		98	76 - 126
Toluene	50.0	54.7		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	53.5		ug/Kg		107	77 - 136
Trichloroethene	50.0	47.7		ug/Kg		95	66 - 130
Vinyl chloride	50.0	36.2		ug/Kg		72	56 - 134
Xylenes, Total	100	110		ug/Kg		110	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: LCSD 160-405938/3-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	44.8		ug/Kg		90	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	51.1		ug/Kg		102	52 - 140	4	20
1,1,2-Trichloroethane	50.0	52.3		ug/Kg		105	79 - 122	1	20
1,1-Dichloroethane	50.0	48.5		ug/Kg		97	80 - 120	0	20
1,1-Dichloroethene	50.0	51.2		ug/Kg		102	71 - 126	1	20
1,2-Dichloroethane	50.0	42.7		ug/Kg		85	68 - 128	2	20
1,2-Dichloroethene, Total	100	109		ug/Kg		109	79 - 121	1	20
1,2-Dichloropropane	50.0	54.0		ug/Kg		108	80 - 126	2	20
2-Butanone (MEK)	50.0	50.8		ug/Kg		102	41 - 140	7	20
2-Hexanone	50.0	47.7		ug/Kg		95	63 - 136	2	20
4-Methyl-2-pentanone (MIBK)	50.0	48.6		ug/Kg		97	67 - 130	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405938/3-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 405938

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone			50.0	42.9		ug/Kg		86	39 - 140	0	20
Benzene			50.0	50.3		ug/Kg		101	80 - 120	0	20
Bromodichloromethane			50.0	47.6		ug/Kg		95	78 - 124	0	20
Bromoform			50.0	47.9		ug/Kg		96	67 - 135	2	20
Bromomethane			50.0	37.6		ug/Kg		75	61 - 132	0	20
Carbon disulfide			50.0	49.2		ug/Kg		98	74 - 124	1	20
Carbon tetrachloride			50.0	44.2		ug/Kg		88	68 - 130	3	20
Chlorobenzene			50.0	51.4		ug/Kg		103	80 - 120	3	20
Chloroethane			50.0	32.7	o	ug/Kg		65	73 - 129	3	20
Chloroform			50.0	44.8		ug/Kg		90	78 - 120	0	20
Chloromethane			50.0	39.3		ug/Kg		79	69 - 123	1	20
cis-1,3-Dichloropropene			50.0	56.3		ug/Kg		113	78 - 127	0	20
Dibromochloromethane			50.0	49.9		ug/Kg		100	77 - 126	0	20
Ethylbenzene			50.0	49.1		ug/Kg		98	79 - 126	3	20
Methylene Chloride			50.0	54.9	B	ug/Kg		110	76 - 120	3	20
Styrene			50.0	56.2		ug/Kg		112	80 - 129	2	20
Tetrachloroethene			50.0	50.4		ug/Kg		101	76 - 126	3	20
Toluene			50.0	55.1		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene			50.0	52.6		ug/Kg		105	77 - 136	2	20
Trichloroethene			50.0	48.0		ug/Kg		96	66 - 130	1	20
Vinyl chloride			50.0	36.2		ug/Kg		72	56 - 134	0	20
Xylenes, Total			100	112		ug/Kg		112	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Lab Sample ID: 160-31887-3 MS
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3KLB3
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane	0.42	U Z	48.3	45.2		ug/Kg	☼	94	80 - 120		
1,1,2,2-Tetrachloroethane	1.9	U Z	48.3	45.6		ug/Kg	☼	94	78 - 120		
1,1,2-Trichloroethane	1.2	U Z	48.3	50.6		ug/Kg	☼	105	80 - 120		
1,1-Dichloroethane	0.38	U Z	48.3	48.7		ug/Kg	☼	101	80 - 120		
1,1-Dichloroethene	1.6	U Z	48.3	51.1		ug/Kg	☼	106	78 - 121		
1,2-Dichloroethane	0.85	U Z	48.3	42.1		ug/Kg	☼	87	78 - 117		
1,2-Dichloroethene, Total	1.3	U Z	96.6	106		ug/Kg	☼	110	80 - 120		
1,2-Dichloropropane	0.59	U Z	48.3	53.1		ug/Kg	☼	110	80 - 120		
2-Butanone (MEK)	1.9	U Z	48.3	46.8		ug/Kg	☼	97	69 - 124		
2-Hexanone	3.3	U Z	48.3	42.6		ug/Kg	☼	88	62 - 118		
4-Methyl-2-pentanone (MIBK)	2.5	U Z	48.3	42.1		ug/Kg	☼	87	73 - 125		
Acetone	6.3	U Z	48.3	42.8		ug/Kg	☼	89	54 - 139		
Benzene	0.25	U Z	48.3	50.3		ug/Kg	☼	104	80 - 120		
Bromodichloromethane	0.49	U Z	48.3	46.8		ug/Kg	☼	97	80 - 120		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31887-3 MS
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3KLB3
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	1.9	U Z	48.3	47.7		ug/Kg	☼	99	80 - 125
Bromomethane	2.3	U Z	48.3	37.4		ug/Kg	☼	77	70 - 126
Carbon disulfide	0.67	U Z	48.3	49.2		ug/Kg	☼	102	79 - 121
Carbon tetrachloride	0.50	U Z	48.3	44.6		ug/Kg	☼	92	80 - 120
Chlorobenzene	0.79	U Z	48.3	48.9		ug/Kg	☼	101	80 - 120
Chloroethane	1.9	U Z o	48.3	32.2		ug/Kg	☼	67	64 - 133
Chloroform	0.37	U Z	48.3	44.3		ug/Kg	☼	92	80 - 120
Chloromethane	0.64	U Z	48.3	41.1		ug/Kg	☼	85	75 - 120
cis-1,3-Dichloropropene	2.1	U Z	48.3	52.6		ug/Kg	☼	109	80 - 120
Dibromochloromethane	1.2	U Z	48.3	46.8		ug/Kg	☼	97	80 - 120
Ethylbenzene	0.67	U Z	48.3	48.7		ug/Kg	☼	101	80 - 120
Methylene Chloride	1.5	U Z	48.3	51.8	B	ug/Kg	☼	107	77 - 123
Styrene	1.9	U Z	48.3	54.0		ug/Kg	☼	112	80 - 120
Tetrachloroethene	0.55	U Z	48.3	49.0		ug/Kg	☼	101	80 - 120
Toluene	2.5	U Z	48.3	54.7		ug/Kg	☼	113	80 - 124
trans-1,3-Dichloropropene	1.7	U Z	48.3	49.1		ug/Kg	☼	102	80 - 122
Trichloroethene	0.38	U Z	48.3	51.2		ug/Kg	☼	106	79 - 120
Vinyl chloride	0.42	U Z	48.3	36.2		ug/Kg	☼	75	71 - 120
Xylenes, Total	0.83	U Z	96.6	109		ug/Kg	☼	113	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*92*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: 160-31887-3 MSD
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3KLB3
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.42	U Z	47.9	44.4		ug/Kg	☼	93	80 - 120	2	20
1,1,2,2-Tetrachloroethane	1.9	U Z	47.9	47.2		ug/Kg	☼	98	78 - 120	3	20
1,1,2-Trichloroethane	1.2	U Z	47.9	49.8		ug/Kg	☼	104	80 - 120	2	20
1,1-Dichloroethane	0.38	U Z	47.9	48.0		ug/Kg	☼	100	80 - 120	2	20
1,1-Dichloroethene	1.6	U Z	47.9	50.1		ug/Kg	☼	105	78 - 121	2	20
1,2-Dichloroethane	0.85	U Z	47.9	41.7		ug/Kg	☼	87	78 - 117	1	20
1,2-Dichloroethene, Total	1.3	U Z	95.9	105		ug/Kg	☼	109	80 - 120	2	20
1,2-Dichloropropane	0.59	U Z	47.9	52.1		ug/Kg	☼	109	80 - 120	2	20
2-Butanone (MEK)	1.9	U Z	47.9	46.7		ug/Kg	☼	97	69 - 124	0	20
2-Hexanone	3.3	U Z	47.9	44.5		ug/Kg	☼	93	62 - 118	4	20
4-Methyl-2-pentanone (MIBK)	2.5	U Z	47.9	43.6		ug/Kg	☼	91	73 - 125	3	20
Acetone	6.3	U Z	47.9	46.2		ug/Kg	☼	96	54 - 139	8	20
Benzene	0.25	U Z	47.9	49.3		ug/Kg	☼	103	80 - 120	2	20
Bromodichloromethane	0.49	U Z	47.9	46.3		ug/Kg	☼	97	80 - 120	1	20
Bromoform	1.9	U Z	47.9	49.1		ug/Kg	☼	102	80 - 125	3	20
Bromomethane	2.3	U Z	47.9	36.8		ug/Kg	☼	77	70 - 126	2	20
Carbon disulfide	0.67	U Z	47.9	47.8		ug/Kg	☼	100	79 - 121	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31887-3 MSD — **Client Sample ID: B3KLB3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405936 — **Prep Batch: 405938**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon tetrachloride	0.50	U Z	47.9	42.7		ug/Kg	☼	89	80 - 120	4	20
Chlorobenzene	0.79	U Z	47.9	48.2		ug/Kg	☼	101	80 - 120	1	20
Chloroethane	1.9	U Z o	47.9	32.1		ug/Kg	☼	67	64 - 133	0	20
Chloroform	0.37	U Z	47.9	44.3		ug/Kg	☼	92	80 - 120	0	20
Chloromethane	0.64	U Z	47.9	40.3		ug/Kg	☼	84	75 - 120	2	20
cis-1,3-Dichloropropene	2.1	U Z	47.9	52.8		ug/Kg	☼	110	80 - 120	0	20
Dibromochloromethane	1.2	U Z	47.9	47.2		ug/Kg	☼	98	80 - 120	1	20
Ethylbenzene	0.67	U Z	47.9	46.8		ug/Kg	☼	98	80 - 120	4	20
Methylene Chloride	1.5	U Z	47.9	51.3	B	ug/Kg	☼	107	77 - 123	1	20
Styrene	1.9	U Z	47.9	52.6		ug/Kg	☼	110	80 - 120	3	20
Tetrachloroethene	0.55	U Z	47.9	47.2		ug/Kg	☼	98	80 - 120	4	20
Toluene	2.5	U Z	47.9	53.5		ug/Kg	☼	112	80 - 124	2	20
trans-1,3-Dichloropropene	1.7	U Z	47.9	48.9		ug/Kg	☼	102	80 - 122	0	20
Trichloroethene	0.38	U Z	47.9	50.2		ug/Kg	☼	105	79 - 120	2	20
Vinyl chloride	0.42	U Z	47.9	35.6		ug/Kg	☼	74	71 - 120	2	20
Xylenes, Total	0.83	U Z	95.9	105		ug/Kg	☼	109	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402826/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403774 — **Prep Batch: 402826**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31887-1	B3KL99	140 X	100	121	99
160-31887-1	B3KL99	86	108	96	100
160-31887-2	B3KLC5	164 X	95	134	99
160-31887-2	B3KLC5	94	99	99	97
160-31887-3	B3KLB3	88	103	100	104
160-31887-3 MS	B3KLB3	83	98	92	101
160-31887-3 MSD	B3KLB3	84	101	93	101
160-31887-4	B3KLB0	92	103	92	104
160-31887-8	B3KL95	151 X	109	124	107
160-31887-9	B3KL93	151 X	110	127	105
160-31887-10	B3KL96	156 X	111	127	107
160-31887-11	B3KLC3	156 X	104	130	101
160-31887-12	B3KLC4	151 X	104	124	102
160-31887-13	B3KLB5	89	99	95	102
160-31887-14	B3KLB4	90	103	96	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-402637/5	Lab Control Sample	120	98	112	106
LCS 160-403184/2-A	Lab Control Sample	133 X	96	115	98
LCS 160-405938/2-A	Lab Control Sample	86	100	95	100
LCSD 160-402637/6	Lab Control Sample Dup	127	102	115	105
LCSD 160-403184/3-A	Lab Control Sample Dup	123	94	113	98
LCSD 160-405938/3-A	Lab Control Sample Dup	83	99	93	103
MB 160-402637/10	Method Blank	126	103	114	102
MB 160-403184/1-A	Method Blank	129	93	115	99
MB 160-405938/1-A	Method Blank	87	99	96	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Date: 08 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Group (SDGs) SL31841-1, SL31884-1, SL31887-1, GEL464275, GEL464511, GEL464549

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31841-1, SL31884-1 and SL31887-1 prepared by TestAmerica Laboratories Inc. and SDGs GEL464275, GEL464511 and GEL464549 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KLB6	11/12/18	Soil	C	8270D
B3KL87	11/12/18	Soil	C	8270D
B3KLB1	11/12/18	Soil	C	8270D
B3KL88	11/12/18	Soil	C	8270D
B3KLB2	11/12/18	Soil	C	8270D
B3KL92	11/13/18	Soil	C	8270D
B3KL94	11/13/18	Soil	C	8270D
B3KL89	11/13/18	Soil	C	8270D
B3KL98	11/13/18	Soil	C	8270D
B3KLB7	11/13/18	Soil	C	8270D
B3KL97	11/13/18	Soil	C	8270D
B3KL99	11/14/18	Soil	C	8270D
B3KLB3	11/14/18	Soil	C	8270D
B3KLB0	11/14/18	Soil	C	8270D
B3KL95	11/14/18	Soil	C	8270D
B3KL93	11/14/18	Soil	C	8270D
B3KL96	11/14/18	Soil	C	8270D
B3KLB5	11/14/18	Soil	C	8270D
B3KLB4	11/14/18	Soil	C	8270D
B3KL65A	11/12/18	Soil	C	WTPH D, WTPH G
B3KL66A	11/12/18	Soil	C	WTPH D, WTPH G
B3KL79A	11/12/18	Soil	C	WTPH D, WTPH G
B3KL80A	11/12/18	Soil	C	WTPH D, WTPH G
B3KL84A	11/12/18	Soil	C	WTPH D, WTPH G
B3KL67A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL70A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL71A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL72A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL73A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL74A	11/13/18	Soil	C	WTPH D, WTPH G

B3KL75A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL76A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL85A	11/13/18	Soil	C	WTPH D, WTPH G
B3KL77A	11/14/18	Soil	C	WTPH D, WTPH G
B3KL78A	11/14/18	Soil	C	WTPH D, WTPH G
B3KL81A	11/14/18	Soil	C	WTPH D, WTPH G
B3KL82A	11/14/18	Soil	C	WTPH D, WTPH G
B3KL83A	11/14/18	Soil	C	WTPH D, WTPH G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for WTPH-G requires analysis within 14 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

Method 8270D
For SDG SL31841-1, the phenol-d5 surrogate recovery for sample B3KL87 was below the lower acceptance limits. The 2-fluorophenol and the 2,4,6-tribromophenol surrogate recoveries were within the acceptance limit, therefore, based on professional judgment, data should not be qualified.

For SDG SL31884-1, the 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for samples B3KL92, B3KL94, B3KL89, B3KLB7 and B3KL92MS were below the lower acceptance limit. In addition the 2,4,6-tribromophenol for samples B3L92MDS and the method blank were below the lower acceptance limit. The other associated surrogate recoveries were within the acceptance limit, therefore based on professional judgment, data should not be qualified. The 2,4,6-tribromophenol, phenol-d6 and the nitrobenzene-d5 surrogate recoveries for sample B3KL97 were below the lower acceptance limit. The sample was analyzed at a 10X dilution and based on professional judgment, data should not be qualified as a result.

For SDG SL31887-1, the 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for samples B3KL95 and B3KLB4 and the nitrobenzene-d5 recovery for sample B3KL99 were below the lower acceptance limit. The other associated surrogate recoveries were within the acceptance limit; and based on professional judgment, data should not be qualified.

Method WTPH D
For SDG 464275, the o-terphenyl surrogate recoveries for samples B3KL80A and B3KL84A were below the lower acceptance limit but ≥10%. The DRO results for samples B3KL80A and B3KL84A were non-detects and should be qualified as estimates and flagged "UJ."

For SDG 464511, the o-terphenyl surrogate recoveries for samples B3KL67A, B3KL72A, B3KL85A and B3KL67AMSD were below the lower acceptance limit. The DRO results for samples B3KL67A, B3KL72A and B3KL85A were non-detects and should be qualified as

estimates and flagged "UJ." Since sample B3KL67AMSD was a QC sample, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

Method 8270D
For SDG SL31841-1, the MS and/or MSD recoveries for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 3,3′dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2-chloroethyl)ether, bis(2 chloro-1-methylethyl)ether, dibenzo(a,h)anthracene and hexachloroethane were below the lower acceptance limit. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample.

For SDG SL31884-1, the MS and/or MSD recoveries for 2,4,-dinitophenol, 4,6-dinitro-2-methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol were <20%. In addition the 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,6-dinitrotoluene, 2-chlorophenol, 2-nitrophenol, 2-methylphenol, 3,3′-dichlorobenzidine, 4-chloro-3-methylphenol, 4-chloroaniline, acenaphthylene, bis(2-chloro-1-methylethyl)ether, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, isophorone and phenol were below the lower acceptance limit but ≥20%. The parent, MS and MSD samples were analyzed at 10X dilution; therefore, based on professional judgment, data should not be qualified as a result.

For SDG SL31887-1, the MS and /or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3′-dichlorobenzidine, 3-nitroaniline, 4-chloroaniline, bis(2-chloroethyl)ether, fluoranthene, hexachlorocyclopentadiene, hexachloroethane, isophorone, phenanthrene and pyrene were below the lower acceptance limit. The parent, MS and MSD samples were analyzed at 10X dilution; therefore, based on professional judgment, data should not be qualified as a result.

Method WTPH D
For SDGs GEL464275 and GEL464511, the MSD recovery for DRO associated with batch 1823436 was below the lower acceptance limit but ≥ 20%. All associated DRO sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL31841-1, the LCS recoveries for 3,3′-dichlorobenzidine, 4-chloroaniline, benzo(ghi)perylene, dibenzo(a,h)anthracene and hexachloroethane were below the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL31884-1, the LCS recoveries for 2,4-dinitrophenol, 3,3′-dichlorobenzidine, 3-nitroaniline, 4-chloroanilinie, bis(2-chloroethyl)ether and hexachlorocyclopentadiene were below the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL31887-1, the LCS recoveries for 3,3′-dichlorobenzidine and 4-chloroaniline were below the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing all affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for WTPH-D and WTPH-G were met.

CRDLs for SVOCs were not provided in the SAP.

- **Completeness**

SDGs SL31841-1, SL31884-1, SL31887-1, GEL464275, GEL464511 and GEL464549 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate, matrix spike and LCS recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL31841-1, SL31884-1, SL31887-1, GEL464275, GEL464511, GEL464549	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, bis(2-chloroethyl)ether, bis(2chloro-1-methylethyl)ether	UJ	B3KLB6, B3KL87, B3KLB1, B3KL88, B3KLB2	Low matrix spike recoveries
3,3-dichlorobenzidine, 4-chloroaniline, benzo(ghi)perylene, dibenz(a,h)anthracene, hexachloroethane	UJ	B3KLB6, B3KL87, B3KLB1, B3KL88, B3KLB2	Low matrix spike recoveries and low LCS recoveries
3,3′-dichlorobenzidine, 4-chloroaniline	UJ	B3KL92, B3KL94, B3KL89, B3KL98, B3KLB7, B3KL97, B3KLB3, B3KLB0, B3KL93, B3KL96, B3KLB5, B3KL99, B3KL95, B3KLB4	Low LCS recoveries
2,4-dinitrophenol, 3-nitroaniline, bis(2-chloroethyl)ether, hexachlorocyclopentadiene	UJ	B3KL92, B3KL94, B3KL89, B3KL98, B3KLB7, B3KL97	Low LCS recovery
DRO	UJ	B3KL80A, B3KL84A, B3KL67A, B3KL72A, B3KL85A	Low surrogate recovery and low matrix spike recovery
DRO	UJ	B3KL66A, B3KL79A, B3KL71A, B3KL73A, B3KL76A	Low matrix spike recovery.

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/08/19	
			SDG: SL31841-1, SL31884-1, SL31887-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL31841-1: B3KLB6, B3KL87, B3KLB1, B3KL88, B3KLB2					
SDG SL31884-1: B3KL92, B3KL94, B3KL89, B3KL98, B3KLB7, B3KL97					
SDG SL31887-1: B3KL99, B3KLB3, B3KLB0, B3KL95, B3KL93, B3KL96, B3KLB5, B3KLB4					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

SDG SL31841-1: B3KL87 PHL 69%

SDG SL31884-1: B3KL92 TBP 66%, NBZ 68%: B3KL94 TBP 58%, NBZ 59%; B3KL89 TBP 57%, NBZ 69%; B3KLB7 TBP 63%, NBZ 65%; B3KL97 TBP 60%, NBZ 59%, PHL 68%; B3KL92MS TBP 64% NBZ 65%: B3KL92MSD TBP 57%: MB TBP 69%

SDG SL31887-1: B3KL99 NBZ 64%; B3KL95 TBP 65%, NBZ 67%; B3KLB4 TBP 61%; NBZ 65%

LCS

SDG SL31841-1: 3,3-dichlorobenzidine 68%, 4-chloroaniline 59%, benzo(ghi)perylene 54%; dibenz(a,h)anthracene 64%, hexachloroethane 67%

SDG SL31884-1: 2,4-dinitrophenol 64%; 3,3-dichlorobenzidine 65%; 3-nitroaniline 69%; 4-chloroaniline 62%; bis(2-chloroethyl)ether 69%; hexachlorocyclopentadiene 64%

SDG SL31887-1: 3,3-dichlorobenzidine 69%; 4-chloroaniline 61%

See last page for MS/MSD information

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided in SAP.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix A - (Cont.) Chemical Data Validation Checklist

MS/MSD

SL31841-1: 1,2-dichlorobenzene 66%(MS); 1,3-dichlorobenzene 62%/67%; 1,4-dichlorobenzene 65% (MS); 3,3-dichlorobenzidine 65%/67%; 4-chloroaniline 60%/55%; benzo(g,h,i)perylene 63% (MS); bis(2-chloroethyl)ether 68%/69%; bis(2 chloro-1-methylethyl)ether 69% MSD; dibenz(a,h)anthracene 67%(MS); hexachloroethane 60%/62%

SDG SL31884-1: 1,2-dichlorobenzene 67% (MS); 1,3-dichlorobenzene 66%/68%; 1,4-dichlorobenzene 69% (MS); 2,4-dinitrophenol 0%/0%; 2,6-dinitrotoluene 69%69%; 2-chlorophenol 69%(MS); 2-nitrophenol 62%; 2-methylphenol 67% (MSD); 3,3-dichlorobenzidine 69% (MS); 4,6-dinitro-2-methylphenol 0%/0%; 4-chloro-3-metylphenol 69% (MS); 4-chloroaniline 56%/54%, 4-nitrophenol 0%/0%; acenaphthylene 69% (MS); bis(2 chloro-1-methylethyl)ether 64%(MS); bis(2-chloroethoxy)methane 68% (MS); bis(2-chloroethyl)ether 68% (MS); hexachlorocyclopentadiene 0%/0%; isophorone 61% (MS); pentachlorophenol 0%/0%; phenol 68% (MS)

SDG SL31887-1: 1,2,4-trichlorobenzene 66% (MS); 1,2-dichlorobenzene 66%(MS); 1,3-dichlorobenzene 65% (MS); 1,4-dichlorobenzene 63%(MS); 2,4-dinitrophenol 58%/55%; 3,3-dichlorobenzidine 63%/63%; 3-nitroaniline 68%/65%; 4-chloroaniline 51%/55%; bis(2-chloroethyl)ether 68% (MS); fluoranthene 63%/61%; hexachlorocyclopentadiene 64%/64%; hexachloroethane 67%/68; isophorone 69%/69%; phenanthrene 62%/61%; pyrene 66%(MSD)

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/08/19	
			SDG: GEL464275, GEL464511, GEL464549		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	
SAMPLES/MATRIX: Soil					
GEL464275: B3KL65A, B3KL66A, B3KL79A, B3KL80A, B3KL84A					
GEL464511: B3KL67A, B3KL70A, B3KL71A, B3KL72A, B3KL73A, B3KL74A, B3KL75A, B3KL76A, B3KL85A					
GEL464549: B3KL77A, B3KL78A, B3KL81A, BKL82A, B3KL83A					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SDG GEL464275: DRO B3KL80A 57%; B3KL84A 54%; B3KL67AMSD 58%(associated with SDG GEL464511)

SDG GEL464511: DRO B3KL67A 56%; B3KL67AMSD 58%; B3KL72A 51%; B3KL85A 55%

MS/MSD

SDG GEL464275 (batch 1823436): DRO MSD 63%

SDG GEL464511 (batch 1823436): DRO MSD 63%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-4 MSD
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL88
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.46	U Z	39.3	41.5		ug/Kg	☼	106	80 - 120	11	20
Bromoform	1.8	U Z	39.3	43.1		ug/Kg	☼	110	80 - 125	7	20
Bromomethane	2.2	U Z	39.3	38.9		ug/Kg	☼	99	70 - 126	12	20
Carbon disulfide	0.64	U Z	39.3	40.9		ug/Kg	☼	104	79 - 121	14	20
Carbon tetrachloride	0.47	U Z	39.3	41.2		ug/Kg	☼	105	80 - 120	15	20
Chlorobenzene	0.75	U Z	39.3	40.8		ug/Kg	☼	104	80 - 120	9	20
Chloroethane	1.8	U Z	39.3	37.7		ug/Kg	☼	96	64 - 133	12	20
Chloroform	0.35	U Z	39.3	40.2		ug/Kg	☼	103	80 - 120	13	20
Chloromethane	0.60	U Z	39.3	35.6		ug/Kg	☼	91	75 - 120	10	20
cis-1,3-Dichloropropene	1.9	U Z	39.3	43.7		ug/Kg	☼	111	80 - 120	12	20
Dibromochloromethane	1.1	U Z	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U Z	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U Z	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U Z	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U Z	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U Z	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U Z	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U Z	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U Z	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U Z T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401099/1-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401099/1-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
2-Picoline	45	U	660	45	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Acenaphthene	35	U	330	35	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Acenaphthylene	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Acetophenone	34	U	330	34	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Aniline	60	U	330	60	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Anthracene	49	U	330	49	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Aramite	330	U	660	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Carbazole	47	U	330	47	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Chrysene	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Diallate	67	U	660	67	ug/Kg		11/15/18 13:59	11/16/18 13:47	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401099/1-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Dibenzofuran	41	U	330	41	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Diethylphthalate	82	U	330	82	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Dimethoate	100	U	660	100	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Dinoseb	330	U	660	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Disulfoton	41	U	1600	41	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Famphur	33	U	3300	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Fluoranthene	50	U	330	50	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Fluorene	46	U	330	46	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachloroethane	35	U	330	35	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Isodrin	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Isophorone	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Isosafrole	67	U	660	67	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Kepone	330	U	3300	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Methapyrilene	140	U	1600	140	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Methyl parathion	120	U	1600	120	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Naphthalene	35	U	330	35	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Nitrobenzene	40	U	330	40	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
o-Toluidine	51	U	330	51	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Parathion	98	U	1600	98	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/15/18 13:59	11/16/18 13:47	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401099/1-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	330	U	1600	330	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Phenacetin	54	U	660	54	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Phenanthrene	42	U	330	42	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Phenol	38	U	330	38	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Phorate	37	U	1600	37	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pronamide	53	U	660	53	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pyrene	73	U	330	73	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Pyridine	71	U	660	71	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Safrole	33	U	660	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/15/18 13:59	11/16/18 13:47	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/15/18 13:59	11/16/18 13:47	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*360*	*N J*	*ug/Kg*		*3.46*	*141-79-7*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
Unknown	*11800*	*N*	*ug/Kg*		*3.76*		*11/15/18 13:59*	*11/16/18 13:47*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*74*		*47 - 125*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
2-Fluorophenol (Surr)	*83*		*54 - 102*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
Nitrobenzene-d5 (Surr)	*83*		*44 - 120*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
Phenol-d5 (Surr)	*77*		*51 - 104*	*11/15/18 13:59*	*11/16/18 13:47*	*1*
Terphenyl-d14 (Surr)	*84*		*59 - 98*	*11/15/18 13:59*	*11/16/18 13:47*	*1*

Lab Sample ID: LCS 160-401099/2-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2690		ug/Kg		81	58 - 101
1,2-Dichlorobenzene	3330	2500		ug/Kg		75	57 - 99
1,3-Dichlorobenzene	3330	2400		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2470		ug/Kg		74	56 - 98
2,4,5-Trichlorophenol	3330	2960		ug/Kg		89	56 - 109
2,4,6-Trichlorophenol	3330	3000		ug/Kg		90	56 - 110
2,4-Dichlorophenol	3330	2610		ug/Kg		78	57 - 99
2,4-Dimethylphenol	3330	2570		ug/Kg		77	53 - 97
2,4-Dinitrophenol	3330	3010	o	ug/Kg		90	10 - 89
2,4-Dinitrotoluene	3330	2730		ug/Kg		82	54 - 105
2,6-Dinitrotoluene	3330	2810		ug/Kg		84	55 - 105
2-Chloronaphthalene	3330	2800		ug/Kg		84	56 - 111
2-Chlorophenol	3330	2610		ug/Kg		78	56 - 99
2-Methylnaphthalene	3330	2580		ug/Kg		77	58 - 98
2-Methylphenol	3330	2720		ug/Kg		82	53 - 97
2-Nitroaniline	3330	2770		ug/Kg		83	55 - 108

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401099/2-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitrophenol	3330	2700		ug/Kg		81	59 - 104
3 & 4 Methylphenol	3330	2980		ug/Kg		89	58 - 108
3,3'-Dichlorobenzidine	3330	2270		ug/Kg		68	42 - 104
3-Nitroaniline	3330	2550		ug/Kg		77	43 - 96
4,6-Dinitro-2-methylphenol	3330	3110		ug/Kg		93	19 - 102
4-Bromophenyl phenyl ether	3330	2890		ug/Kg		87	58 - 109
4-Chloro-3-methylphenol	3330	2690		ug/Kg		81	54 - 98
4-Chloroaniline	3330	1960		ug/Kg		59	41 - 83
4-Chlorophenyl phenyl ether	3330	3050		ug/Kg		92	55 - 105
4-Nitroaniline	3330	2690		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2640		ug/Kg		79	48 - 106
Acenaphthene	3330	2790		ug/Kg		84	55 - 106
Acenaphthylene	3330	2710		ug/Kg		81	56 - 109
Anthracene	3330	2810		ug/Kg		84	56 - 103
Benzo[a]anthracene	3330	2860		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2860		ug/Kg		86	57 - 109
Benzo[b]fluoranthene	3330	2870		ug/Kg		86	68 - 109
Benzo[g,h,i]perylene	3330	1800		ug/Kg		54	51 - 126
Benzo[k]fluoranthene	3330	2790		ug/Kg		84	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2530		ug/Kg		76	49 - 94
Bis(2-chloroethoxy)methane	3330	2580		ug/Kg		77	56 - 99
Bis(2-chloroethyl)ether	3330	2400		ug/Kg		72	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2780		ug/Kg		83	59 - 113
Butyl benzyl phthalate	3330	2770		ug/Kg		83	60 - 112
Carbazole	3330	2630		ug/Kg		79	53 - 98
Chrysene	3330	2870		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	2140		ug/Kg		64	52 - 126
Dibenzofuran	3330	2700		ug/Kg		81	55 - 103
Diethylphthalate	3330	3000		ug/Kg		90	54 - 101
Di-n-butyl phthalate	3330	2760		ug/Kg		83	57 - 102
Di-n-octyl phthalate	3330	2980		ug/Kg		89	56 - 117
Fluoranthene	3330	2890		ug/Kg		87	54 - 100
Fluorene	3330	2790		ug/Kg		84	57 - 106
Hexachlorobenzene	3330	2790		ug/Kg		84	57 - 109
Hexachlorobutadiene	3330	2610		ug/Kg		78	59 - 106
Hexachlorocyclopentadiene	3330	2510		ug/Kg		75	44 - 140
Hexachloroethane	3330	2240		ug/Kg		67	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2500		ug/Kg		75	52 - 132
Isophorone	3330	2520		ug/Kg		76	55 - 96
Naphthalene	3330	2650		ug/Kg		79	57 - 98
Nitrobenzene	3330	2580		ug/Kg		77	58 - 102
N-Nitrosodi-n-propylamine	3330	2510		ug/Kg		75	54 - 98
Diphenylamine + N-Nitrosodiphenylamine	3330	3070		ug/Kg		92	63 - 121
Pentachlorophenol	3330	2650		ug/Kg		79	35 - 107
Phenanthrene	3330	2930		ug/Kg		88	57 - 103
Phenol	3330	2700		ug/Kg		81	50 - 96
Pyrene	3330	2870		ug/Kg		86	59 - 109

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401099/2-A
Matrix: Solid
Analysis Batch: 401259

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401099

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*88*		*54 - 102*
Nitrobenzene-d5 (Surr)	*84*		*44 - 120*
Phenol-d5 (Surr)	*83*		*51 - 104*
Terphenyl-d14 (Surr)	*89*		*59 - 98*

Lab Sample ID: 160-31841-1 MS
Matrix: Soil
Analysis Batch: 401259

Client Sample ID: B3KLB6
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	35	U	3490	2650		ug/Kg	☼	76	52 - 103
1,2-Dichlorobenzene	37	U	3490	2290		ug/Kg	☼	66	50 - 98
1,3-Dichlorobenzene	38	U	3490	2180		ug/Kg	☼	62	49 - 96
1,4-Dichlorobenzene	39	U	3490	2260		ug/Kg	☼	65	50 - 96
2,4,5-Trichlorophenol	55	U	3490	3010		ug/Kg	☼	86	41 - 116
2,4,6-Trichlorophenol	48	U	3490	3080		ug/Kg	☼	88	40 - 115
2,4-Dichlorophenol	41	U	3490	2690		ug/Kg	☼	77	47 - 104
2,4-Dimethylphenol	58	U	3490	2700		ug/Kg	☼	77	45 - 105
2,4-Dinitrophenol	350	U o	3490	2930		ug/Kg	☼	84	10 - 100
2,4-Dinitrotoluene	130	U	3490	2710		ug/Kg	☼	78	42 - 113
2,6-Dinitrotoluene	66	U	3490	2880		ug/Kg	☼	83	46 - 109
2-Chloronaphthalene	39	U	3490	2780		ug/Kg	☼	80	52 - 108
2-Chlorophenol	40	U	3490	2520		ug/Kg	☼	72	48 - 102
2-Methylnaphthalene	42	U	3490	2610		ug/Kg	☼	75	55 - 97
2-Methylphenol	45	U	3490	2550		ug/Kg	☼	73	46 - 98
2-Nitroaniline	130	U	3490	2800		ug/Kg	☼	80	45 - 111
2-Nitrophenol	150	U	3490	2600		ug/Kg	☼	75	38 - 115
3 & 4 Methylphenol	70	U	3490	2870		ug/Kg	☼	82	48 - 111
3,3'-Dichlorobenzidine	120	U	3490	2270		ug/Kg	☼	65	23 - 102
3-Nitroaniline	110	U	3490	2540		ug/Kg	☼	73	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3490	3070		ug/Kg	☼	88	15 - 118
4-Bromophenyl phenyl ether	51	U	3490	2840		ug/Kg	☼	82	53 - 110
4-Chloro-3-methylphenol	44	U	3490	2780		ug/Kg	☼	80	36 - 111
4-Chloroaniline	49	U	3490	2090		ug/Kg	☼	60	32 - 79
4-Chlorophenyl phenyl ether	45	U	3490	3030		ug/Kg	☼	87	51 - 103
4-Nitroaniline	78	U	3490	2690		ug/Kg	☼	77	36 - 102
4-Nitrophenol	350	U	3490	2590		ug/Kg	☼	74	40 - 113
Acenaphthene	36	U	3490	2810		ug/Kg	☼	81	53 - 105
Acenaphthylene	48	U	3490	2740		ug/Kg	☼	78	55 - 107
Anthracene	52	U	3490	2790		ug/Kg	☼	80	55 - 103
Benzo[a]anthracene	62	U	3490	2780		ug/Kg	☼	80	48 - 112
Benzo[a]pyrene	94	U	3490	2770		ug/Kg	☼	79	46 - 117
Benzo[b]fluoranthene	35	U	3490	2890		ug/Kg	☼	83	45 - 125
Benzo[g,h,i]perylene	35	U	3490	2190		ug/Kg	☼	63	24 - 134
Benzo[k]fluoranthene	84	U	3490	2700		ug/Kg	☼	77	43 - 114
bis(2 chloro-1-methylethyl) ether	44	U	3490	2450		ug/Kg	☼	70	38 - 98

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-31841-1 MS
Matrix: Soil
Analysis Batch: 401259

Client Sample ID: B3KLB6
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-chloroethoxy)methane	39	U	3490	2590		ug/Kg	☼	74	49 - 100
Bis(2-chloroethyl)ether	35	U	3490	2360		ug/Kg	☼	68	49 - 100
Bis(2-ethylhexyl) phthalate	89	U	3490	2750		ug/Kg	☼	79	50 - 113
Butyl benzyl phthalate	97	U	3490	2710		ug/Kg	☼	78	54 - 112
Carbazole	50	U	3490	2610		ug/Kg	☼	75	47 - 102
Chrysene	48	U	3490	2840		ug/Kg	☼	81	45 - 115
Dibenz(a,h)anthracene	69	U	3490	2330		ug/Kg	☼	67	30 - 134
Dibenzofuran	43	U	3490	2750		ug/Kg	☼	79	50 - 102
Diethylphthalate	86	U	3490	2980		ug/Kg	☼	85	46 - 107
Di-n-butyl phthalate	67	U	3490	2750		ug/Kg	☼	79	49 - 107
Di-n-octyl phthalate	140	U	3490	2960		ug/Kg	☼	85	35 - 125
Fluoranthene	53	U	3490	2880		ug/Kg	☼	82	45 - 109
Fluorene	48	U	3490	2780		ug/Kg	☼	80	45 - 109
Hexachlorobenzene	44	U	3490	2730		ug/Kg	☼	78	48 - 113
Hexachlorobutadiene	42	U	3490	2590		ug/Kg	☼	74	48 - 109
Hexachlorocyclopentadiene	350	U	3490	2620		ug/Kg	☼	75	21 - 144
Hexachloroethane	36	U	3490	2080		ug/Kg	☼	60	44 - 102
Indeno[1,2,3-cd]pyrene	66	U	3490	2460		ug/Kg	☼	71	30 - 136
Isophorone	39	U	3490	2520		ug/Kg	☼	72	48 - 100
Naphthalene	37	U	3490	2710		ug/Kg	☼	78	54 - 98
Nitrobenzene	42	U	3490	2680		ug/Kg	☼	77	51 - 106
N-Nitrosodi-n-propylamine	43	U	3490	2430		ug/Kg	☼	70	47 - 104
Diphenylamine + N-Nitrosodiphenylamine	35	U	3490	3060		ug/Kg	☼	88	33 - 140
Pentachlorophenol	350	U	3490	2550		ug/Kg	☼	73	23 - 116
Phenanthrene	45	U	3490	2890		ug/Kg	☼	83	53 - 106
Phenol	40	U	3490	2560		ug/Kg	☼	73	41 - 100
Pyrene	77	U	3490	2810		ug/Kg	☼	81	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*84*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*81*		*54 - 102*
Nitrobenzene-d5 (Surr)	*83*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

Lab Sample ID: 160-31841-1 MSD
Matrix: Soil
Analysis Batch: 401259

Client Sample ID: B3KLB6
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	35	U	3520	2910		ug/Kg	☼	83	52 - 103	9	30
1,2-Dichlorobenzene	37	U	3520	2450		ug/Kg	☼	70	50 - 98	7	30
1,3-Dichlorobenzene	38	U	3520	2350		ug/Kg	☼	67	49 - 96	8	30
1,4-Dichlorobenzene	39	U	3520	2500		ug/Kg	☼	71	50 - 96	10	30
2,4,5-Trichlorophenol	55	U	3520	3210		ug/Kg	☼	91	41 - 116	6	30
2,4,6-Trichlorophenol	48	U	3520	3240		ug/Kg	☼	92	40 - 115	5	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-31841-1 MSD
Matrix: Soil
Analysis Batch: 401259

Client Sample ID: B3KLB6
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4-Dichlorophenol	41	U	3520	2770		ug/Kg	☼	79	47 - 104	3	30
2,4-Dimethylphenol	58	U	3520	2830		ug/Kg	☼	80	45 - 105	5	30
2,4-Dinitrophenol	350	U o	3520	3030		ug/Kg	☼	86	10 - 100	3	30
2,4-Dinitrotoluene	130	U	3520	2900		ug/Kg	☼	82	42 - 113	6	30
2,6-Dinitrotoluene	66	U	3520	2990		ug/Kg	☼	85	46 - 109	4	30
2-Chloronaphthalene	39	U	3520	3000		ug/Kg	☼	85	52 - 108	8	30
2-Chlorophenol	40	U	3520	2720		ug/Kg	☼	77	48 - 102	8	30
2-Methylnaphthalene	42	U	3520	2800		ug/Kg	☼	80	55 - 97	7	30
2-Methylphenol	45	U	3520	2730		ug/Kg	☼	78	46 - 98	7	30
2-Nitroaniline	130	U	3520	2850		ug/Kg	☼	81	45 - 111	2	30
2-Nitrophenol	150	U	3520	2930		ug/Kg	☼	83	38 - 115	12	30
3 & 4 Methylphenol	70	U	3520	2900		ug/Kg	☼	82	48 - 111	1	30
3,3'-Dichlorobenzidine	120	U	3520	2360		ug/Kg	☼	67	23 - 102	4	30
3-Nitroaniline	110	U	3520	2560		ug/Kg	☼	73	32 - 95	1	30
4,6-Dinitro-2-methylphenol	350	U	3520	3200		ug/Kg	☼	91	15 - 118	4	30
4-Bromophenyl phenyl ether	51	U	3520	3180		ug/Kg	☼	90	53 - 110	11	30
4-Chloro-3-methylphenol	44	U	3520	2840		ug/Kg	☼	81	36 - 111	2	30
4-Chloroaniline	49	U	3520	1930		ug/Kg	☼	55	32 - 79	8	30
4-Chlorophenyl phenyl ether	45	U	3520	3190		ug/Kg	☼	91	51 - 103	5	30
4-Nitroaniline	78	U	3520	2680		ug/Kg	☼	76	36 - 102	0	30
4-Nitrophenol	350	U	3520	2610		ug/Kg	☼	74	40 - 113	1	30
Acenaphthene	36	U	3520	2960		ug/Kg	☼	84	53 - 105	5	30
Acenaphthylene	48	U	3520	2930		ug/Kg	☼	83	55 - 107	7	30
Anthracene	52	U	3520	2980		ug/Kg	☼	85	55 - 103	7	30
Benzo[a]anthracene	62	U	3520	2990		ug/Kg	☼	85	48 - 112	7	30
Benzo[a]pyrene	94	U	3520	3000		ug/Kg	☼	85	46 - 117	8	30
Benzo[b]fluoranthene	35	U	3520	2990		ug/Kg	☼	85	45 - 125	3	30
Benzo[g,h,i]perylene	35	U	3520	2450		ug/Kg	☼	70	24 - 134	11	30
Benzo[k]fluoranthene	84	U	3520	2940		ug/Kg	☼	84	43 - 114	9	30
bis(2 chloro-1-methylethyl) ether	44	U	3520	2440		ug/Kg	☼	69	38 - 98	0	30
Bis(2-chloroethoxy)methane	39	U	3520	2740		ug/Kg	☼	78	49 - 100	6	30
Bis(2-chloroethyl)ether	35	U	3520	2450		ug/Kg	☼	69	49 - 100	4	30
Bis(2-ethylhexyl) phthalate	89	U	3520	2910		ug/Kg	☼	82	50 - 113	6	30
Butyl benzyl phthalate	97	U	3520	2860		ug/Kg	☼	81	54 - 112	6	30
Carbazole	50	U	3520	2750		ug/Kg	☼	78	47 - 102	5	30
Chrysene	48	U	3520	3070		ug/Kg	☼	87	45 - 115	8	30
Dibenz(a,h)anthracene	69	U	3520	2610		ug/Kg	☼	74	30 - 134	11	30
Dibenzofuran	43	U	3520	2900		ug/Kg	☼	82	50 - 102	5	30
Diethylphthalate	86	U	3520	3080		ug/Kg	☼	88	46 - 107	3	30
Di-n-butyl phthalate	67	U	3520	2950		ug/Kg	☼	84	49 - 107	7	30
Di-n-octyl phthalate	140	U	3520	3160		ug/Kg	☼	90	35 - 125	7	30
Fluoranthene	53	U	3520	3040		ug/Kg	☼	86	45 - 109	6	30
Fluorene	48	U	3520	2940		ug/Kg	☼	83	45 - 109	6	30
Hexachlorobenzene	44	U	3520	2990		ug/Kg	☼	85	48 - 113	9	30
Hexachlorobutadiene	42	U	3520	2960		ug/Kg	☼	84	48 - 109	13	30
Hexachlorocyclopentadiene	350	U	3520	2790		ug/Kg	☼	79	21 - 144	6	30
Hexachloroethane	36	U	3520	2190		ug/Kg	☼	62	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	66	U	3520	2780		ug/Kg	☼	79	30 - 136	12	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-31841-1 MSD
Matrix: Soil
Analysis Batch: 401259

Client Sample ID: B3KLB6
Prep Type: Total/NA
Prep Batch: 401099

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Isophorone	39	U	3520	2630		ug/Kg	☼	75	48 - 100	4	30
Naphthalene	37	U	3520	2910		ug/Kg	☼	83	54 - 98	7	30
Nitrobenzene	42	U	3520	2780		ug/Kg	☼	79	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3520	2510		ug/Kg	☼	71	47 - 104	3	30
Diphenylamine + N-Nitrosodiphenylamine	35	U	3520	3240		ug/Kg	☼	92	33 - 140	6	30
Pentachlorophenol	350	U	3520	2860		ug/Kg	☼	81	23 - 116	12	30
Phenanthrene	45	U	3520	3070		ug/Kg	☼	87	53 - 106	6	30
Phenol	40	U	3520	2700		ug/Kg	☼	77	41 - 100	5	30
Pyrene	77	U	3520	3010		ug/Kg	☼	85	39 - 130	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*90*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*86*		*44 - 120*
Phenol-d5 (Surr)	*79*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31841-1
SDG: SL31841-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31841-1	B3KLB6	125	101	115	100
160-31841-2	B3KL87	91	42 X	70	45 X
160-31841-3	B3KLB1	134 X	107	120	105
160-31841-4	B3KL88	104	93	101	98
160-31841-4 MS	B3KL88	102	99	105	101
160-31841-4 MSD	B3KL88	103	101	106	106
160-31841-5	B3KLB2	142 X	105	120	105
160-31841-6	B3KLC2	200 X	149	138	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-402637/5	Lab Control Sample	120	98	112	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-402637/6	Lab Control Sample Dup	127	102	115	105
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-402637/10	Method Blank	126	103	114	102
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31841-1	B3KLB6	83	87	80	81	73	87
160-31841-1 MS	B3KLB6	84	84	81	83	78	85
160-31841-1 MSD	B3KLB6	90	87	82	86	79	90
160-31841-2	B3KL87	76	77	76	74	69	78
160-31841-3	B3KLB1	77	84	84	82	79	79
160-31841-4	B3KL88	81	85	83	79	76	82
160-31841-5	B3KLB2	78	87	87	83	84	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31841-1
SDG: SL31841-1

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
		TBP	FBP	2FP	NBZ	PHL	TPHL		
Lab Sample ID	**Client Sample ID**	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)		
LCS 160-401099/2-A	Lab Control Sample	89	87	88	84	83	89		
MB 160-401099/1-A	Method Blank	74	85	83	83	77	84		

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31884-10 MSD
Matrix: Soil
Analysis Batch: 407502

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.52	U Z	46.2	49.7		ug/Kg	☼	108	80 - 120	2	20
Bromoform	2.0	U Z T	46.2	57.0		ug/Kg	☼	123	80 - 125	0	20
Bromomethane	2.5	U Z	46.2	45.5		ug/Kg	☼	99	70 - 126	2	20
Carbon disulfide	0.73	U Z	46.2	47.4		ug/Kg	☼	103	79 - 121	0	20
Carbon tetrachloride	0.54	U Z	46.2	47.4		ug/Kg	☼	103	80 - 120	1	20
Chlorobenzene	0.85	U Z	46.2	49.2		ug/Kg	☼	107	80 - 120	0	20
Chloroethane	2.1	U Z	46.2	42.0		ug/Kg	☼	91	64 - 133	1	20
Chloroform	0.40	U Z	46.2	47.4		ug/Kg	☼	103	80 - 120	0	20
Chloromethane	0.68	U Z	46.2	41.8		ug/Kg	☼	91	75 - 120	2	20
cis-1,3-Dichloropropene	2.2	U Z	46.2	53.1		ug/Kg	☼	115	80 - 120	5	20
Dibromochloromethane	1.3	U Z	46.2	53.8		ug/Kg	☼	117	80 - 120	2	20
Ethylbenzene	0.73	U Z	46.2	47.6		ug/Kg	☼	103	80 - 120	2	20
Methylene Chloride	1.7	U Z	46.2	48.8		ug/Kg	☼	106	77 - 123	1	20
Styrene	2.1	U Z	46.2	50.7		ug/Kg	☼	110	80 - 120	0	20
Tetrachloroethene	0.59	U Z	46.2	47.1		ug/Kg	☼	102	80 - 120	2	20
Toluene	2.6	U Z	46.2	51.2		ug/Kg	☼	111	80 - 124	0	20
trans-1,3-Dichloropropene	1.8	U Z	46.2	55.0		ug/Kg	☼	119	80 - 122	2	20
Trichloroethene	0.41	U Z	46.2	49.8		ug/Kg	☼	108	79 - 120	2	20
Vinyl chloride	0.45	U Z	46.2	45.7		ug/Kg	☼	99	71 - 120	2	20
Xylenes, Total	0.89	U Z	92.3	105		ug/Kg	☼	113	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*104*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylphenol	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Picoline	45	U	660	45	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acenaphthene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acenaphthylene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acetophenone	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Aniline	60	U	330	60	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Anthracene	49	U	330	49	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Aramite	330	U	660	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Carbazole	47	U	330	47	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chrysene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Diallate	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dibenzofuran	41	U	330	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Diethylphthalate	82	U	330	82	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dimethoate	100	U	660	100	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dinoseb	330	U	660	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Disulfoton	41	U	1600	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Famphur	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Fluoranthene	50	U	330	50	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Fluorene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachloroethane	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isodrin	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isophorone	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isosafrole	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Kepone	330	U	3300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methapyrilene	140	U	1600	140	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methyl parathion	120	U	1600	120	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Naphthalene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Nitrobenzene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
o-Toluidine	51	U	330	51	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Parathion	98	U	1600	98	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachloroethane	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenacetin	54	U	660	54	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenanthrene	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenol	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phorate	37	U	1600	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pronamide	53	U	660	53	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pyrene	73	U	330	73	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pyridine	71	U	660	71	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Safrole	33	U	660	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*478*	*N J*	*ug/Kg*		*4.27*	*141-79-7*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Unknown	*7450*	*N*	*ug/Kg*		*4.61*		*11/20/18 17:21*	*12/03/18 11:33*	*1*
Unknown	*733*	*N*	*ug/Kg*		*5.15*		*11/20/18 17:21*	*12/03/18 11:33*	*1*
n-Hexadecanoic acid	*478*	*N J*	*ug/Kg*		*10.99*	*57-10-3*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
5-Eicosene, (E)-	*352*	*N J*	*ug/Kg*		*13.89*	*74685-30-6*	*11/20/18 17:21*	*12/03/18 11:33*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*69*		*47 - 125*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
2-Fluorophenol (Surr)	*76*		*54 - 102*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Phenol-d5 (Surr)	*75*		*51 - 104*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Terphenyl-d14 (Surr)	*82*		*59 - 98*	*11/20/18 17:21*	*12/03/18 11:33*	*1*

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2440		ug/Kg		73	58 - 101
1,2-Dichlorobenzene	3330	2440		ug/Kg		73	57 - 99
1,3-Dichlorobenzene	3330	2420		ug/Kg		73	55 - 98
1,4-Dichlorobenzene	3330	2500		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2540		ug/Kg		76	56 - 109
2,4,6-Trichlorophenol	3330	2660		ug/Kg		80	56 - 110
2,4-Dichlorophenol	3330	2690		ug/Kg		81	57 - 99
2,4-Dimethylphenol	3330	2480		ug/Kg		74	53 - 97
2,4-Dinitrophenol	3330	2140		ug/Kg		64	10 - 89
2,4-Dinitrotoluene	3330	2610		ug/Kg		78	54 - 105
2,6-Dinitrotoluene	3330	2520		ug/Kg		76	55 - 105

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloronaphthalene	3330	2560		ug/Kg		77	56 - 111
2-Chlorophenol	3330	2590		ug/Kg		78	56 - 99
2-Methylnaphthalene	3330	2590		ug/Kg		78	58 - 98
2-Methylphenol	3330	2540		ug/Kg		76	53 - 97
2-Nitroaniline	3330	2480		ug/Kg		74	55 - 108
2-Nitrophenol	3330	2420		ug/Kg		73	59 - 104
3 & 4 Methylphenol	3330	2950		ug/Kg		88	58 - 108
3,3'-Dichlorobenzidine	3330	2160		ug/Kg		65	42 - 104
3-Nitroaniline	3330	2310		ug/Kg		69	43 - 96
4,6-Dinitro-2-methylphenol	3330	2520		ug/Kg		76	19 - 102
4-Bromophenyl phenyl ether	3330	2660		ug/Kg		80	58 - 109
4-Chloro-3-methylphenol	3330	2630		ug/Kg		79	54 - 98
4-Chloroaniline	3330	2060		ug/Kg		62	41 - 83
4-Chlorophenyl phenyl ether	3330	2600		ug/Kg		78	55 - 105
4-Nitroaniline	3330	2690		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2470		ug/Kg		74	48 - 106
Acenaphthene	3330	2630		ug/Kg		79	55 - 106
Acenaphthylene	3330	2580		ug/Kg		78	56 - 109
Anthracene	3330	2640		ug/Kg		79	56 - 103
Benzo[a]anthracene	3330	2700		ug/Kg		81	56 - 107
Benzo[a]pyrene	3330	2670		ug/Kg		80	57 - 109
Benzo[b]fluoranthene	3330	2620		ug/Kg		79	68 - 109
Benzo[g,h,i]perylene	3330	2490		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2530		ug/Kg		76	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2380		ug/Kg		71	49 - 94
Bis(2-chloroethoxy)methane	3330	2540		ug/Kg		76	56 - 99
Bis(2-chloroethyl)ether	3330	2310		ug/Kg		69	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2760		ug/Kg		83	59 - 113
Butyl benzyl phthalate	3330	2710		ug/Kg		81	60 - 112
Carbazole	3330	2680		ug/Kg		80	53 - 98
Chrysene	3330	2670		ug/Kg		80	54 - 107
Dibenz(a,h)anthracene	3330	2590		ug/Kg		78	52 - 126
Dibenzofuran	3330	2570		ug/Kg		77	55 - 103
Diethylphthalate	3330	2730		ug/Kg		82	54 - 101
Di-n-butyl phthalate	3330	2760		ug/Kg		83	57 - 102
Di-n-octyl phthalate	3330	2940		ug/Kg		88	56 - 117
Fluoranthene	3330	2620		ug/Kg		79	54 - 100
Fluorene	3330	2680		ug/Kg		80	57 - 106
Hexachlorobenzene	3330	2700		ug/Kg		81	57 - 109
Hexachlorobutadiene	3330	2580		ug/Kg		77	59 - 106
Hexachlorocyclopentadiene	3330	2140		ug/Kg		64	44 - 140
Hexachloroethane	3330	2360		ug/Kg		71	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2610		ug/Kg		78	52 - 132
Isophorone	3330	2380		ug/Kg		71	55 - 96
Naphthalene	3330	2520		ug/Kg		76	57 - 98
Nitrobenzene	3330	2570		ug/Kg		77	58 - 102
N-Nitrosodi-n-propylamine	3330	2590		ug/Kg		78	54 - 98

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diphenylamine + N-Nitrosodiphenylamine	3330	3170		ug/Kg		95	63 - 121
Pentachlorophenol	3330	2600		ug/Kg		78	35 - 107
Phenanthrene	3330	2670		ug/Kg		80	57 - 103
Phenol	3330	2560		ug/Kg		77	50 - 96
Pyrene	3330	2650		ug/Kg		80	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*
2-Fluorophenol (Surr)	*76*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*82*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-31884-10 MS
Matrix: Soil
Analysis Batch: 403813

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	350	U D	3520	2550	J D	ug/Kg	☼	72	52 - 103
1,2-Dichlorobenzene - DL	370	U D	3520	2360	J D	ug/Kg	☼	67	50 - 98
1,3-Dichlorobenzene - DL	390	U D	3520	2340	J D	ug/Kg	☼	66	49 - 96
1,4-Dichlorobenzene - DL	390	U D	3520	2440	J D	ug/Kg	☼	69	50 - 96
2,4,5-Trichlorophenol - DL	550	U D	3520	2630	J D	ug/Kg	☼	75	41 - 116
2,4,6-Trichlorophenol - DL	480	U D	3520	2540	J D	ug/Kg	☼	72	40 - 115
2,4-Dichlorophenol - DL	410	U D	3520	2480	J D	ug/Kg	☼	70	47 - 104
2,4-Dimethylphenol - DL	580	U D	3520	2540	J D	ug/Kg	☼	72	45 - 105
2,4-Dinitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	10 - 100
2,4-Dinitrotoluene - DL	1300	U D	3520	2590	J D	ug/Kg	☼	74	42 - 113
2,6-Dinitrotoluene - DL	660	U D	3520	2440	J D	ug/Kg	☼	69	46 - 109
2-Chloronaphthalene - DL	390	U D	3520	2600	J D	ug/Kg	☼	74	52 - 108
2-Chlorophenol - DL	400	U D	3520	2450	J D	ug/Kg	☼	69	48 - 102
2-Methylnaphthalene - DL	420	U D	3520	2590	J D	ug/Kg	☼	74	55 - 97
2-Methylphenol - DL	450	U D	3520	2550	J D	ug/Kg	☼	72	46 - 98
2-Nitroaniline - DL	1300	U D	3520	2730	J D	ug/Kg	☼	78	45 - 111
2-Nitrophenol - DL	1500	U D	3520	2180	J D	ug/Kg	☼	62	38 - 115
3 & 4 Methylphenol - DL	700	U D	3520	2780	J D	ug/Kg	☼	79	48 - 111
3,3'-Dichlorobenzidine - DL	1200	U D	3520	2440	J D	ug/Kg	☼	69	23 - 102
3-Nitroaniline - DL	1100	U D	3520	2500	J D	ug/Kg	☼	71	32 - 95
4,6-Dinitro-2-methylphenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	15 - 118
4-Bromophenyl phenyl ether - DL	510	U D	3520	2490	J D	ug/Kg	☼	71	53 - 110
4-Chloro-3-methylphenol - DL	440	U D	3520	2440	J D	ug/Kg	☼	69	36 - 111
4-Chloroaniline - DL	490	U D	3520	1980	J D	ug/Kg	☼	56	32 - 79
4-Chlorophenyl phenyl ether - DL	450	U D	3520	2630	J D	ug/Kg	☼	75	51 - 103
4-Nitroaniline - DL	780	U D	3520	2560	J D	ug/Kg	☼	73	36 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-10 MS
Matrix: Soil
Analysis Batch: 403813

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	40 - 113
Acenaphthene - DL	370	U D	3520	2630	J D	ug/Kg	☼	75	53 - 105
Acenaphthylene - DL	480	U D	3520	2430	J D	ug/Kg	☼	69	55 - 107
Anthracene - DL	520	U D	3520	2500	J D	ug/Kg	☼	71	55 - 103
Benzo[a]anthracene - DL	630	U D	3520	2640	J D	ug/Kg	☼	75	48 - 112
Benzo[a]pyrene - DL	940	U D	3520	2830	J D	ug/Kg	☼	80	46 - 117
Benzo[b]fluoranthene - DL	350	U D	3520	2770	J D	ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene - DL	350	U D	3520	2760	J D	ug/Kg	☼	78	24 - 134
Benzo[k]fluoranthene - DL	840	U D	3520	2710	J D	ug/Kg	☼	77	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	440	U D	3520	2250	J D	ug/Kg	☼	64	38 - 98
Bis(2-chloroethoxy)methane - DL	400	U D	3520	2390	J D	ug/Kg	☼	68	49 - 100
Bis(2-chloroethyl)ether - DL	350	U D	3520	2400	J D	ug/Kg	☼	68	49 - 100
Bis(2-ethylhexyl) phthalate - DL	900	U D	3520	3200	J D	ug/Kg	☼	91	50 - 113
Butyl benzyl phthalate - DL	970	U D	3520	3030	J D	ug/Kg	☼	86	54 - 112
Carbazole - DL	500	U D	3520	2550	J D	ug/Kg	☼	72	47 - 102
Chrysene - DL	480	U D	3520	2700	J D	ug/Kg	☼	77	45 - 115
Dibenz(a,h)anthracene - DL	690	U D	3520	2850	J D	ug/Kg	☼	81	30 - 134
Dibenzofuran - DL	430	U D	3520	2600	J D	ug/Kg	☼	74	50 - 102
Diethylphthalate - DL	860	U D	3520	2800	J D	ug/Kg	☼	80	46 - 107
Di-n-butyl phthalate - DL	670	U D	3520	2890	J D	ug/Kg	☼	82	49 - 107
Di-n-octyl phthalate - DL	1400	U D	3520	3250	J D	ug/Kg	☼	92	35 - 125
Fluoranthene - DL	530	U D	3520	2960	J D	ug/Kg	☼	84	45 - 109
Fluorene - DL	480	U D	3520	2720	J D	ug/Kg	☼	77	45 - 109
Hexachlorobenzene - DL	440	U D	3520	2490	J D	ug/Kg	☼	71	48 - 113
Hexachlorobutadiene - DL	420	U D	3520	2770	J D	ug/Kg	☼	79	48 - 109
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144
Hexachloroethane - DL	360	U D	3520	2410	J D	ug/Kg	☼	68	44 - 102
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	2970	J D	ug/Kg	☼	84	30 - 136
Isophorone - DL	390	U D	3520	2140	J D	ug/Kg	☼	61	48 - 100
Naphthalene - DL	370	U D	3520	2480	J D	ug/Kg	☼	71	54 - 98
Nitrobenzene - DL	420	U D	3520	2460	J D	ug/Kg	☼	70	51 - 106
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2460	J D	ug/Kg	☼	70	47 - 104
Diphenylamine + N-Nitrosodiphenylamine - DL	350	U D	3520	3070	J D	ug/Kg	☼	87	33 - 140
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116
Phenanthrene - DL	450	U D	3520	2690	J D	ug/Kg	☼	76	53 - 106
Phenol - DL	400	U D	3520	2380	J D	ug/Kg	☼	68	41 - 100
Pyrene - DL	770	U D	3520	2980	J D	ug/Kg	☼	85	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*64*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*72*		*59 - 110*
2-Fluorophenol (Surr) - DL	*70*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*65*		*44 - 120*
Phenol-d5 (Surr) - DL	*70*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*85*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-10 MSD
Matrix: Soil
Analysis Batch: 403813

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	350	U D	3520	2570	J D	ug/Kg	☼	73	52 - 103	1	30
1,2-Dichlorobenzene - DL	370	U D	3520	2680	J D	ug/Kg	☼	76	50 - 98	12	30
1,3-Dichlorobenzene - DL	390	U D	3520	2390	J D	ug/Kg	☼	68	49 - 96	2	30
1,4-Dichlorobenzene - DL	390	U D	3520	2490	J D	ug/Kg	☼	71	50 - 96	2	30
2,4,5-Trichlorophenol - DL	550	U D	3520	3130	J D	ug/Kg	☼	89	41 - 116	17	30
2,4,6-Trichlorophenol - DL	480	U D	3520	2860	J D	ug/Kg	☼	81	40 - 115	12	30
2,4-Dichlorophenol - DL	410	U D	3520	2790	J D	ug/Kg	☼	79	47 - 104	12	30
2,4-Dimethylphenol - DL	580	U D	3520	2610	J D	ug/Kg	☼	74	45 - 105	3	30
2,4-Dinitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	10 - 100	NC	30
2,4-Dinitrotoluene - DL	1300	U D	3520	2960	J D	ug/Kg	☼	84	42 - 113	13	30
2,6-Dinitrotoluene - DL	660	U D	3520	2410	J D	ug/Kg	☼	69	46 - 109	1	30
2-Chloronaphthalene - DL	390	U D	3520	2640	J D	ug/Kg	☼	75	52 - 108	1	30
2-Chlorophenol - DL	400	U D	3520	2680	J D	ug/Kg	☼	76	48 - 102	9	30
2-Methylnaphthalene - DL	420	U D	3520	2760	J D	ug/Kg	☼	78	55 - 97	6	30
2-Methylphenol - DL	450	U D	3520	2360	J D	ug/Kg	☼	67	46 - 98	8	30
2-Nitroaniline - DL	1300	U D	3520	2940	J D	ug/Kg	☼	84	45 - 111	7	30
2-Nitrophenol - DL	1500	U D	3520	2670	J D	ug/Kg	☼	76	38 - 115	20	30
3 & 4 Methylphenol - DL	700	U D	3520	3050	J D	ug/Kg	☼	87	48 - 111	9	30
3,3'-Dichlorobenzidine - DL	1200	U D	3520	2650	J D	ug/Kg	☼	75	23 - 102	8	30
3-Nitroaniline - DL	1100	U D	3520	2730	J D	ug/Kg	☼	77	32 - 95	9	30
4,6-Dinitro-2-methylphenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	15 - 118	NC	30
4-Bromophenyl phenyl ether - DL	510	U D	3520	2680	J D	ug/Kg	☼	76	53 - 110	8	30
4-Chloro-3-methylphenol - DL	440	U D	3520	2800	J D	ug/Kg	☼	79	36 - 111	14	30
4-Chloroaniline - DL	490	U D	3520	1890	J D	ug/Kg	☼	54	32 - 79	5	30
4-Chlorophenyl phenyl ether - DL	450	U D	3520	2880	J D	ug/Kg	☼	82	51 - 103	9	30
4-Nitroaniline - DL	780	U D	3520	2850	J D	ug/Kg	☼	81	36 - 102	10	30
4-Nitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	40 - 113	NC	30
Acenaphthene - DL	370	U D	3520	2740	J D	ug/Kg	☼	78	53 - 105	4	30
Acenaphthylene - DL	480	U D	3520	2540	J D	ug/Kg	☼	72	55 - 107	4	30
Anthracene - DL	520	U D	3520	2650	J D	ug/Kg	☼	75	55 - 103	6	30
Benzo[a]anthracene - DL	630	U D	3520	2970	J D	ug/Kg	☼	84	48 - 112	12	30
Benzo[a]pyrene - DL	940	U D	3520	2990	J D	ug/Kg	☼	85	46 - 117	5	30
Benzo[b]fluoranthene - DL	350	U D	3520	2890	J D	ug/Kg	☼	82	45 - 125	4	30
Benzo[g,h,i]perylene - DL	350	U D	3520	2930	J D	ug/Kg	☼	83	24 - 134	6	30
Benzo[k]fluoranthene - DL	840	U D	3520	2920	J D	ug/Kg	☼	83	43 - 114	8	30
bis(2 chloro-1-methylethyl) ether - DL	440	U D	3520	2610	J D	ug/Kg	☼	74	38 - 98	15	30
Bis(2-chloroethoxy)methane - DL	400	U D	3520	2750	J D	ug/Kg	☼	78	49 - 100	14	30
Bis(2-chloroethyl)ether - DL	350	U D	3520	2470	J D	ug/Kg	☼	70	49 - 100	3	30
Bis(2-ethylhexyl) phthalate - DL	900	U D	3520	3450	J D	ug/Kg	☼	98	50 - 113	7	30
Butyl benzyl phthalate - DL	970	U D	3520	3480	J D	ug/Kg	☼	99	54 - 112	14	30
Carbazole - DL	500	U D	3520	2820	J D	ug/Kg	☼	80	47 - 102	10	30
Chrysene - DL	480	U D	3520	2830	J D	ug/Kg	☼	80	45 - 115	5	30
Dibenz(a,h)anthracene - DL	690	U D	3520	3040	J D	ug/Kg	☼	86	30 - 134	6	30
Dibenzofuran - DL	430	U D	3520	2820	J D	ug/Kg	☼	80	50 - 102	8	30
Diethylphthalate - DL	860	U D	3520	3110	J D	ug/Kg	☼	88	46 - 107	10	30
Di-n-butyl phthalate - DL	670	U D	3520	3050	J D	ug/Kg	☼	87	49 - 107	6	30
Di-n-octyl phthalate - DL	1400	U D	3520	3620	D	ug/Kg	☼	103	35 - 125	11	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-10 MSD
Matrix: Soil
Analysis Batch: 403813

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoranthene - DL	530	U D	3520	3070	J D	ug/Kg	☼	87	45 - 109	3	30
Fluorene - DL	480	U D	3520	2980	J D	ug/Kg	☼	85	45 - 109	9	30
Hexachlorobenzene - DL	440	U D	3520	2360	J D	ug/Kg	☼	67	48 - 113	5	30
Hexachlorobutadiene - DL	420	U D	3520	2660	J D	ug/Kg	☼	75	48 - 109	4	30
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144	NC	30
Hexachloroethane - DL	360	U D	3520	2270	J D	ug/Kg	☼	64	44 - 102	6	30
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	3130	J D	ug/Kg	☼	89	30 - 136	5	30
Isophorone - DL	390	U D	3520	2500	J D	ug/Kg	☼	71	48 - 100	16	30
Naphthalene - DL	370	U D	3520	2700	J D	ug/Kg	☼	77	54 - 98	8	30
Nitrobenzene - DL	420	U D	3520	2740	J D	ug/Kg	☼	78	51 - 106	11	30
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2560	J D	ug/Kg	☼	73	47 - 104	4	30
Diphenylamine + N-Nitrosodiphenylamine - DL	350	U D	3520	3220	J D	ug/Kg	☼	91	33 - 140	5	30
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116	NC	30
Phenanthrene - DL	450	U D	3520	2890	J D	ug/Kg	☼	82	53 - 106	7	30
Phenol - DL	400	U D	3520	2590	J D	ug/Kg	☼	73	41 - 100	8	30
Pyrene - DL	770	U D	3520	3140	J D	ug/Kg	☼	89	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*57*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*75*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*87*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-401823/1-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31884-10	B3KL92	104	106	103	104
160-31884-10 MS	B3KL92	103	109	105	108
160-31884-10 MSD	B3KL92	107	106	104	106
160-31884-11	B3KL94	146 X	108	121	104
160-31884-12	B3KL89	147 X	108	123	109
160-31884-13	B3KL98	164 X	113	144 X	101
160-31884-14	B3KLB7	156 X	105	126	101
160-31884-15	B3KL97	147 X	108	119	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-402637/5	Lab Control Sample	120	98	112	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-402637/6	Lab Control Sample Dup	127	102	115	105
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-402637/10	Method Blank	126	103	114	102
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31884-10 - DL	B3KL92	66	76	71	68	73	84
160-31884-10 MS - DL	B3KL92	64	72	70	65	70	85
160-31884-10 MSD - DL	B3KL92	57	77	76	73	75	87
160-31884-11 - DL	B3KL94	58	76	71	59	73	90
160-31884-12 - DL	B3KL89	57	80	78	69	81	90
160-31884-13 - DL	B3KL98	53	78	75	63	72	93
160-31884-14 - DL	B3KLB7	63	79	79	65	80	89
160-31884-15 - DL	B3KL97	60	74	63	59	68	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-401921/2-A	Lab Control Sample	80	77	76	75	78	82
MB 160-401921/1-A	Method Blank	69	80	76	67	75	82

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-1	B3KL67	94	77

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-2	B3KL70	98	85
160-31884-6	B3KL74	90	85
160-31884-7	B3KL75	96	87
160-31884-7 MSD	B3KL75	86	85
160-31884-9	B3KL85	97	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31887-3 MSD
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3KLB3
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon tetrachloride	0.50	U Z	47.9	42.7		ug/Kg	☼	89	80 - 120	4	20
Chlorobenzene	0.79	U Z	47.9	48.2		ug/Kg	☼	101	80 - 120	1	20
Chloroethane	1.9	U Z o	47.9	32.1		ug/Kg	☼	67	64 - 133	0	20
Chloroform	0.37	U Z	47.9	44.3		ug/Kg	☼	92	80 - 120	0	20
Chloromethane	0.64	U Z	47.9	40.3		ug/Kg	☼	84	75 - 120	2	20
cis-1,3-Dichloropropene	2.1	U Z	47.9	52.8		ug/Kg	☼	110	80 - 120	0	20
Dibromochloromethane	1.2	U Z	47.9	47.2		ug/Kg	☼	98	80 - 120	1	20
Ethylbenzene	0.67	U Z	47.9	46.8		ug/Kg	☼	98	80 - 120	4	20
Methylene Chloride	1.5	U Z	47.9	51.3	B	ug/Kg	☼	107	77 - 123	1	20
Styrene	1.9	U Z	47.9	52.6		ug/Kg	☼	110	80 - 120	3	20
Tetrachloroethene	0.55	U Z	47.9	47.2		ug/Kg	☼	98	80 - 120	4	20
Toluene	2.5	U Z	47.9	53.5		ug/Kg	☼	112	80 - 124	2	20
trans-1,3-Dichloropropene	1.7	U Z	47.9	48.9		ug/Kg	☼	102	80 - 122	0	20
Trichloroethene	0.38	U Z	47.9	50.2		ug/Kg	☼	105	79 - 120	2	20
Vinyl chloride	0.42	U Z	47.9	35.6		ug/Kg	☼	74	71 - 120	2	20
Xylenes, Total	0.83	U Z	95.9	105		ug/Kg	☼	109	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402826/1-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402826

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402826/1-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402826

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Methylphenol	42	U	330	42	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
2-Picoline	45	U	660	45	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Acenaphthene	35	U	330	35	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Acenaphthylene	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Acetophenone	34	U	330	34	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Aniline	60	U	330	60	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Anthracene	49	U	330	49	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Aramite	330	U	660	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Carbazole	47	U	330	47	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Chrysene	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Diallate	67	U	660	67	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Dibenzofuran	41	U	330	41	ug/Kg		11/27/18 14:15	12/02/18 14:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402826/1-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402826

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diethylphthalate	82	U	330	82	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Dimethoate	100	U	660	100	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Dinoseb	330	U	660	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Disulfoton	41	U	1600	41	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Famphur	33	U	3300	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Fluoranthene	50	U	330	50	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Fluorene	46	U	330	46	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachloroethane	35	U	330	35	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Isodrin	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Isophorone	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Isosafrole	67	U	660	67	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Kepone	330	U	3300	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Methapyrilene	140	U	1600	140	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Methyl parathion	120	U	1600	120	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Naphthalene	35	U	330	35	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Nitrobenzene	40	U	330	40	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
o-Toluidine	51	U	330	51	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Parathion	98	U	1600	98	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Phenacetin	54	U	660	54	ug/Kg		11/27/18 14:15	12/02/18 14:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402826/1-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402826

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenanthrene	42	U	330	42	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Phenol	38	U	330	38	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Phorate	37	U	1600	37	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pronamide	53	U	660	53	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pyrene	73	U	330	73	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Pyridine	71	U	660	71	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Safrole	33	U	660	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/27/18 14:15	12/02/18 14:27	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/27/18 14:15	12/02/18 14:27	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*621*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
Unknown	*11000*	*N*	*ug/Kg*		*4.61*		*11/27/18 14:15*	*12/02/18 14:27*	*1*
Unknown	*789*	*N*	*ug/Kg*		*5.15*		*11/27/18 14:15*	*12/02/18 14:27*	*1*
n-Hexadecanoic acid	*344*	*N J*	*ug/Kg*		*10.99*	*57-10-3*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
Unknown	*254*	*N*	*ug/Kg*		*13.89*		*11/27/18 14:15*	*12/02/18 14:27*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*74*		*47 - 125*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
2-Fluorobiphenyl (Surr)	*88*		*59 - 110*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
2-Fluorophenol (Surr)	*81*		*54 - 102*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
Nitrobenzene-d5 (Surr)	*72*		*44 - 120*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
Phenol-d5 (Surr)	*79*		*51 - 104*	*11/27/18 14:15*	*12/02/18 14:27*	*1*
Terphenyl-d14 (Surr)	*93*		*59 - 98*	*11/27/18 14:15*	*12/02/18 14:27*	*1*

Lab Sample ID: LCS 160-402826/2-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2630		ug/Kg		79	58 - 101
1,2-Dichlorobenzene	3330	2610		ug/Kg		78	57 - 99
1,3-Dichlorobenzene	3330	2570		ug/Kg		77	55 - 98
1,4-Dichlorobenzene	3330	2630		ug/Kg		79	56 - 98
2,4,5-Trichlorophenol	3330	2710		ug/Kg		81	56 - 109
2,4,6-Trichlorophenol	3330	2850		ug/Kg		85	56 - 110
2,4-Dichlorophenol	3330	2910		ug/Kg		87	57 - 99
2,4-Dimethylphenol	3330	2790		ug/Kg		84	53 - 97
2,4-Dinitrophenol	3330	2550		ug/Kg		76	10 - 89
2,4-Dinitrotoluene	3330	2800		ug/Kg		84	54 - 105
2,6-Dinitrotoluene	3330	2790		ug/Kg		84	55 - 105
2-Chloronaphthalene	3330	2790		ug/Kg		84	56 - 111
2-Chlorophenol	3330	2800		ug/Kg		84	56 - 99
2-Methylnaphthalene	3330	2830		ug/Kg		85	58 - 98
2-Methylphenol	3330	2750		ug/Kg		83	53 - 97

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402826/2-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitroaniline	3330	2820		ug/Kg		84	55 - 108
2-Nitrophenol	3330	2890		ug/Kg		87	59 - 104
3 & 4 Methylphenol	3330	3230		ug/Kg		97	58 - 108
3,3'-Dichlorobenzidine	3330	2310		ug/Kg		69	42 - 104
3-Nitroaniline	3330	2380		ug/Kg		71	43 - 96
4,6-Dinitro-2-methylphenol	3330	3070		ug/Kg		92	19 - 102
4-Bromophenyl phenyl ether	3330	2820		ug/Kg		85	58 - 109
4-Chloro-3-methylphenol	3330	2940		ug/Kg		88	54 - 98
4-Chloroaniline	3330	2030		ug/Kg		61	41 - 83
4-Chlorophenyl phenyl ether	3330	2710		ug/Kg		81	55 - 105
4-Nitroaniline	3330	2780		ug/Kg		84	49 - 99
4-Nitrophenol	3330	2770		ug/Kg		83	48 - 106
Acenaphthene	3330	2820		ug/Kg		85	55 - 106
Acenaphthylene	3330	2750		ug/Kg		83	56 - 109
Anthracene	3330	2890		ug/Kg		87	56 - 103
Benzo[a]anthracene	3330	2930		ug/Kg		88	56 - 107
Benzo[a]pyrene	3330	2860		ug/Kg		86	57 - 109
Benzo[b]fluoranthene	3330	2890		ug/Kg		87	68 - 109
Benzo[g,h,i]perylene	3330	2660		ug/Kg		80	51 - 126
Benzo[k]fluoranthene	3330	2740		ug/Kg		82	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2770		ug/Kg		83	49 - 94
Bis(2-chloroethoxy)methane	3330	2850		ug/Kg		85	56 - 99
Bis(2-chloroethyl)ether	3330	2610		ug/Kg		78	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3030		ug/Kg		91	59 - 113
Butyl benzyl phthalate	3330	2950		ug/Kg		89	60 - 112
Carbazole	3330	2940		ug/Kg		88	53 - 98
Chrysene	3330	2920		ug/Kg		88	54 - 107
Dibenz(a,h)anthracene	3330	2830		ug/Kg		85	52 - 126
Dibenzofuran	3330	2810		ug/Kg		84	55 - 103
Diethylphthalate	3330	2940		ug/Kg		88	54 - 101
Di-n-butyl phthalate	3330	2970		ug/Kg		89	57 - 102
Di-n-octyl phthalate	3330	3200		ug/Kg		96	56 - 117
Fluoranthene	3330	2830		ug/Kg		85	54 - 100
Fluorene	3330	2910		ug/Kg		87	57 - 106
Hexachlorobenzene	3330	2880		ug/Kg		87	57 - 109
Hexachlorobutadiene	3330	2710		ug/Kg		81	59 - 106
Hexachlorocyclopentadiene	3330	2470		ug/Kg		74	44 - 140
Hexachloroethane	3330	2620		ug/Kg		79	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2870		ug/Kg		86	52 - 132
Isophorone	3330	2580		ug/Kg		77	55 - 96
Naphthalene	3330	2750		ug/Kg		83	57 - 98
Nitrobenzene	3330	2870		ug/Kg		86	58 - 102
N-Nitrosodi-n-propylamine	3330	2900		ug/Kg		87	54 - 98
Diphenylamine + N-Nitrosodiphenylamine	3330	3500		ug/Kg		105	63 - 121
Pentachlorophenol	3330	2710		ug/Kg		81	35 - 107
Phenanthrene	3330	2960		ug/Kg		89	57 - 103
Phenol	3330	2830		ug/Kg		85	50 - 96

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402826/2-A
Matrix: Solid
Analysis Batch: 403774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pyrene	3330	2900		ug/Kg		87	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*85*		*54 - 102*
Nitrobenzene-d5 (Surr)	*85*		*44 - 120*
Phenol-d5 (Surr)	*83*		*51 - 104*
Terphenyl-d14 (Surr)	*88*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-31887-1 MS
Matrix: Soil
Analysis Batch: 403774

Client Sample ID: B3KL99
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	170	U D	3470	2290	D	ug/Kg	☼	66	52 - 103
1,2-Dichlorobenzene - DL	180	U D	3470	2270	D	ug/Kg	☼	66	50 - 98
1,3-Dichlorobenzene - DL	190	U D	3470	2270	D	ug/Kg	☼	65	49 - 96
1,4-Dichlorobenzene - DL	190	U D	3470	2200	D	ug/Kg	☼	63	50 - 96
2,4,5-Trichlorophenol - DL	270	U D	3470	2740	D	ug/Kg	☼	79	41 - 116
2,4,6-Trichlorophenol - DL	240	U D	3470	2650	D	ug/Kg	☼	76	40 - 115
2,4-Dichlorophenol - DL	200	U D	3470	2700	D	ug/Kg	☼	78	47 - 104
2,4-Dimethylphenol - DL	290	U D	3470	2690	D	ug/Kg	☼	78	45 - 105
2,4-Dinitrophenol - DL	1700	U D	3470	2000	J D	ug/Kg	☼	58	10 - 100
2,4-Dinitrotoluene - DL	660	U D	3470	2800	D	ug/Kg	☼	81	42 - 113
2,6-Dinitrotoluene - DL	320	U D	3470	2510	D	ug/Kg	☼	72	46 - 109
2-Chloronaphthalene - DL	190	U D	3470	2540	D	ug/Kg	☼	73	52 - 108
2-Chlorophenol - DL	200	U D	3470	2440	D	ug/Kg	☼	70	48 - 102
2-Methylnaphthalene - DL	210	U D	3470	2640	D	ug/Kg	☼	76	55 - 97
2-Methylphenol - DL	220	U D	3470	2500	D	ug/Kg	☼	72	46 - 98
2-Nitroaniline - DL	620	U D	3470	2830	D	ug/Kg	☼	82	45 - 111
2-Nitrophenol - DL	750	U D	3470	2500	D	ug/Kg	☼	72	38 - 115
3 & 4 Methylphenol - DL	350	U D	3470	3020	J D	ug/Kg	☼	87	48 - 111
3,3'-Dichlorobenzidine - DL	590	U D	3470	2200	J D	ug/Kg	☼	63	23 - 102
3-Nitroaniline - DL	530	U D	3470	2340	D	ug/Kg	☼	68	32 - 95
4,6-Dinitro-2-methylphenol - DL	1700	U D	3470	2640	J D	ug/Kg	☼	76	15 - 118
4-Bromophenyl phenyl ether - DL	250	U D	3470	2770	D	ug/Kg	☼	80	53 - 110
4-Chloro-3-methylphenol - DL	220	U D	3470	2980	D	ug/Kg	☼	86	36 - 111
4-Chloroaniline - DL	240	U D	3470	1780	D	ug/Kg	☼	51	32 - 79
4-Chlorophenyl phenyl ether - DL	220	U D	3470	2770	D	ug/Kg	☼	80	51 - 103
4-Nitroaniline - DL	390	U D	3470	2730	J D	ug/Kg	☼	79	36 - 102
4-Nitrophenol - DL	1700	U D	3470	2790	J D	ug/Kg	☼	80	40 - 113
Acenaphthene - DL	180	U D	3470	2740	D	ug/Kg	☼	79	53 - 105
Acenaphthylene - DL	240	U D	3470	2570	D	ug/Kg	☼	74	55 - 107
Anthracene - DL	260	U D	3470	2780	D	ug/Kg	☼	80	55 - 103
Benzo[a]anthracene - DL	310	U D	3470	2940	D	ug/Kg	☼	85	48 - 112

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31887-1 MS
Matrix: Soil
Analysis Batch: 403774

Client Sample ID: B3KL99
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzo[a]pyrene - DL	470	U D	3470	2930	D	ug/Kg	☼	84	46 - 117
Benzo[b]fluoranthene - DL	170	U D	3470	2970	D	ug/Kg	☼	86	45 - 125
Benzo[g,h,i]perylene - DL	170	U D	3470	3700	D	ug/Kg	☼	107	24 - 134
Benzo[k]fluoranthene - DL	420	U D	3470	2830	D	ug/Kg	☼	81	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	220	U D	3470	2430	D	ug/Kg	☼	70	38 - 98
Bis(2-chloroethoxy)methane - DL	200	U D	3470	2740	D	ug/Kg	☼	79	49 - 100
Bis(2-chloroethyl)ether - DL	170	U D	3470	2360	D	ug/Kg	☼	68	49 - 100
Bis(2-ethylhexyl) phthalate - DL	440	U D	3470	3090	D	ug/Kg	☼	89	50 - 113
Butyl benzyl phthalate - DL	480	U D	3470	3080	D	ug/Kg	☼	89	54 - 112
Carbazole - DL	250	U D	3470	2950	D	ug/Kg	☼	85	47 - 102
Chrysene - DL	240	U D	3470	2930	D	ug/Kg	☼	84	45 - 115
Dibenz(a,h)anthracene - DL	340	U D	3470	3450	D	ug/Kg	☼	99	30 - 134
Dibenzofuran - DL	210	U D	3470	2690	D	ug/Kg	☼	78	50 - 102
Diethylphthalate - DL	430	U D	3470	2900	D	ug/Kg	☼	83	46 - 107
Di-n-butyl phthalate - DL	330	U D	3470	3060	D	ug/Kg	☼	88	49 - 107
Di-n-octyl phthalate - DL	690	U D	3470	3050	D	ug/Kg	☼	88	35 - 125
Fluoranthene - DL	860	J D	3470	3050	D	ug/Kg	☼	63	45 - 109
Fluorene - DL	240	U D	3470	2780	D	ug/Kg	☼	80	45 - 109
Hexachlorobenzene - DL	220	U D	3470	2660	D	ug/Kg	☼	77	48 - 113
Hexachlorobutadiene - DL	210	U D	3470	2450	D	ug/Kg	☼	71	48 - 109
Hexachlorocyclopentadiene - DL	1700	U D	3470	2220	J D	ug/Kg	☼	64	21 - 144
Hexachloroethane - DL	180	U D	3470	2340	D	ug/Kg	☼	67	44 - 102
Indeno[1,2,3-cd]pyrene - DL	330	U D	3470	3710	D	ug/Kg	☼	107	30 - 136
Isophorone - DL	190	U D	3470	2390	D	ug/Kg	☼	69	48 - 100
Naphthalene - DL	180	U D	3470	2470	D	ug/Kg	☼	71	54 - 98
Nitrobenzene - DL	210	U D	3470	2620	D	ug/Kg	☼	75	51 - 106
N-Nitrosodi-n-propylamine - DL	210	U D	3470	2590	D	ug/Kg	☼	75	47 - 104
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3470	3420	D	ug/Kg	☼	98	33 - 140
Pentachlorophenol - DL	1700	U D	3470	2540	J D	ug/Kg	☼	73	23 - 116
Phenanthrene - DL	790	J D	3470	2940	D	ug/Kg	☼	62	53 - 106
Phenol - DL	200	U D	3470	2560	D	ug/Kg	☼	74	41 - 100
Pyrene - DL	580	J D	3470	3050	D	ug/Kg	☼	71	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*70*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*75*		*44 - 120*
Phenol-d5 (Surr) - DL	*73*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*86*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31887-1 MSD
Matrix: Soil
Analysis Batch: 403774

Client Sample ID: B3KL99
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	170	U D	3460	2520	D	ug/Kg	☼	73	52 - 103	10	30
1,2-Dichlorobenzene - DL	180	U D	3460	2530	D	ug/Kg	☼	73	50 - 98	11	30
1,3-Dichlorobenzene - DL	190	U D	3460	2620	D	ug/Kg	☼	76	49 - 96	15	30
1,4-Dichlorobenzene - DL	190	U D	3460	2440	D	ug/Kg	☼	71	50 - 96	10	30
2,4,5-Trichlorophenol - DL	270	U D	3460	2790	D	ug/Kg	☼	81	41 - 116	2	30
2,4,6-Trichlorophenol - DL	240	U D	3460	2660	D	ug/Kg	☼	77	40 - 115	0	30
2,4-Dichlorophenol - DL	200	U D	3460	2850	D	ug/Kg	☼	83	47 - 104	6	30
2,4-Dimethylphenol - DL	290	U D	3460	2610	D	ug/Kg	☼	76	45 - 105	3	30
2,4-Dinitrophenol - DL	1700	U D	3460	1900	J D	ug/Kg	☼	55	10 - 100	5	30
2,4-Dinitrotoluene - DL	660	U D	3460	2670	D	ug/Kg	☼	77	42 - 113	5	30
2,6-Dinitrotoluene - DL	320	U D	3460	2560	D	ug/Kg	☼	74	46 - 109	2	30
2-Chloronaphthalene - DL	190	U D	3460	2760	D	ug/Kg	☼	80	52 - 108	8	30
2-Chlorophenol - DL	200	U D	3460	2690	D	ug/Kg	☼	78	48 - 102	10	30
2-Methylnaphthalene - DL	210	U D	3460	2730	D	ug/Kg	☼	79	55 - 97	3	30
2-Methylphenol - DL	220	U D	3460	2610	D	ug/Kg	☼	76	46 - 98	4	30
2-Nitroaniline - DL	620	U D	3460	2760	D	ug/Kg	☼	80	45 - 111	2	30
2-Nitrophenol - DL	750	U D	3460	2640	D	ug/Kg	☼	76	38 - 115	6	30
3 & 4 Methylphenol - DL	350	U D	3460	3100	J D	ug/Kg	☼	90	48 - 111	2	30
3,3'-Dichlorobenzidine - DL	590	U D	3460	2170	J D	ug/Kg	☼	63	23 - 102	1	30
3-Nitroaniline - DL	530	U D	3460	2260	D	ug/Kg	☼	65	32 - 95	4	30
4,6-Dinitro-2-methylphenol - DL	1700	U D	3460	2520	J D	ug/Kg	☼	73	15 - 118	5	30
4-Bromophenyl phenyl ether - DL	250	U D	3460	2640	D	ug/Kg	☼	76	53 - 110	5	30
4-Chloro-3-methylphenol - DL	220	U D	3460	2820	D	ug/Kg	☼	82	36 - 111	5	30
4-Chloroaniline - DL	240	U D	3460	1890	D	ug/Kg	☼	55	32 - 79	6	30
4-Chlorophenyl phenyl ether - DL	220	U D	3460	2720	D	ug/Kg	☼	79	51 - 103	2	30
4-Nitroaniline - DL	390	U D	3460	2540	J D	ug/Kg	☼	73	36 - 102	7	30
4-Nitrophenol - DL	1700	U D	3460	2760	J D	ug/Kg	☼	80	40 - 113	1	30
Acenaphthene - DL	180	U D	3460	2690	D	ug/Kg	☼	78	53 - 105	2	30
Acenaphthylene - DL	240	U D	3460	2670	D	ug/Kg	☼	77	55 - 107	4	30
Anthracene - DL	260	U D	3460	2700	D	ug/Kg	☼	78	55 - 103	3	30
Benzo[a]anthracene - DL	310	U D	3460	2840	D	ug/Kg	☼	82	48 - 112	4	30
Benzo[a]pyrene - DL	470	U D	3460	2780	D	ug/Kg	☼	81	46 - 117	5	30
Benzo[b]fluoranthene - DL	170	U D	3460	2830	D	ug/Kg	☼	82	45 - 125	5	30
Benzo[g,h,i]perylene - DL	170	U D	3460	3580	D	ug/Kg	☼	103	24 - 134	4	30
Benzo[k]fluoranthene - DL	420	U D	3460	2770	D	ug/Kg	☼	80	43 - 114	2	30
bis(2 chloro-1-methylethyl) ether - DL	220	U D	3460	2510	D	ug/Kg	☼	72	38 - 98	3	30
Bis(2-chloroethoxy)methane - DL	200	U D	3460	2670	D	ug/Kg	☼	77	49 - 100	2	30
Bis(2-chloroethyl)ether - DL	170	U D	3460	2430	D	ug/Kg	☼	70	49 - 100	3	30
Bis(2-ethylhexyl) phthalate - DL	440	U D	3460	2940	D	ug/Kg	☼	85	50 - 113	5	30
Butyl benzyl phthalate - DL	480	U D	3460	2930	D	ug/Kg	☼	85	54 - 112	5	30
Carbazole - DL	250	U D	3460	2860	D	ug/Kg	☼	83	47 - 102	3	30
Chrysene - DL	240	U D	3460	2830	D	ug/Kg	☼	82	45 - 115	3	30
Dibenz(a,h)anthracene - DL	340	U D	3460	3290	D	ug/Kg	☼	95	30 - 134	5	30
Dibenzofuran - DL	210	U D	3460	2770	D	ug/Kg	☼	80	50 - 102	3	30
Diethylphthalate - DL	430	U D	3460	2860	D	ug/Kg	☼	83	46 - 107	1	30
Di-n-butyl phthalate - DL	330	U D	3460	2840	D	ug/Kg	☼	82	49 - 107	7	30
Di-n-octyl phthalate - DL	690	U D	3460	2980	D	ug/Kg	☼	86	35 - 125	3	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31887-1 MSD
Matrix: Soil
Analysis Batch: 403774

Client Sample ID: B3KL99
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoranthene - DL	860	J D	3460	2960	D	ug/Kg	☼	61	45 - 109	3	30
Fluorene - DL	240	U D	3460	2830	D	ug/Kg	☼	82	45 - 109	2	30
Hexachlorobenzene - DL	220	U D	3460	2720	D	ug/Kg	☼	79	48 - 113	2	30
Hexachlorobutadiene - DL	210	U D	3460	2560	D	ug/Kg	☼	74	48 - 109	4	30
Hexachlorocyclopentadiene - DL	1700	U D	3460	2200	J D	ug/Kg	☼	64	21 - 144	1	30
Hexachloroethane - DL	180	U D	3460	2370	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	330	U D	3460	3430	D	ug/Kg	☼	99	30 - 136	8	30
Isophorone - DL	190	U D	3460	2370	D	ug/Kg	☼	69	48 - 100	1	30
Naphthalene - DL	180	U D	3460	2590	D	ug/Kg	☼	75	54 - 98	5	30
Nitrobenzene - DL	210	U D	3460	2730	D	ug/Kg	☼	79	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3460	2550	D	ug/Kg	☼	74	47 - 104	2	30
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3460	3360	D	ug/Kg	☼	97	33 - 140	2	30
Pentachlorophenol - DL	1700	U D	3460	2540	J D	ug/Kg	☼	73	23 - 116	0	30
Phenanthrene - DL	790	J D	3460	2910	D	ug/Kg	☼	61	53 - 106	1	30
Phenol - DL	200	U D	3460	2730	D	ug/Kg	☼	79	41 - 100	6	30
Pyrene - DL	580	J D	3460	2840	D	ug/Kg	☼	66	39 - 130	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*78*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*75*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*72*		*44 - 120*
Phenol-d5 (Surr) - DL	*76*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*82*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31887-1 - DL	B3KL99	71	81	75	64	78	84
160-31887-1 MS - DL	B3KL99	70	77	76	75	73	86
160-31887-1 MSD - DL	B3KL99	78	83	75	72	76	82
160-31887-3	B3KLB3	76	82	84	71	82	85
160-31887-4	B3KLB0	76	85	80	70	81	87
160-31887-8 - DL	B3KL95	65	75	78	67	80	84
160-31887-9	B3KL93	75	80	78	70	77	81
160-31887-10	B3KL96	76	82	80	71	80	84
160-31887-13	B3KLB5	80	85	83	70	83	89
160-31887-14 - DL	B3KLB4	61	74	74	65	72	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-402826/2-A	Lab Control Sample	82	84	85	85	83	88
MB 160-402826/1-A	Method Blank	74	88	81	72	79	93

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31887-5	B3KL78	101	93
160-31887-5 MS	B3KL78	97	95
160-31887-5 MSD	B3KL78	92	89
160-31887-6	B3KL82	92	87
160-31887-7	B3KL83	108	94
160-31887-15	B3KL81	92	90
160-31887-16	B3KL77	97	88

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 27, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464275**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1823436											
QC1204161727 LCS											
Diesel Range Organics	66500				58200	UG/KG		87	(70%-130%)	LXA1	11/17/18 14:56
**o-Terphenyl	665				544	UG/KG		82	(50%-150%)		
QC1204161726 MB											
Diesel Range Organics				U	2150	UG/KG					11/17/18 14:17
**o-Terphenyl	661				453	UG/KG		69	(50%-150%)		
QC1204161730 464511010 MS											
Diesel Range Organics	68700	TU	2220		48100	UG/KG		70	(70%-130%)		11/17/18 22:02
**o-Terphenyl	687		384		456	UG/KG		66	(50%-150%)		
QC1204161731 464511010 MSD											
Diesel Range Organics	68200	TU	2220	T	42900	UG/KG	11	63*	(0%-20%)		11/17/18 22:41
**o-Terphenyl	682		384		397	UG/KG		58	(50%-150%)		
Batch 1824576											
QC1204164339 LCS											
Diesel Range Organics	66400				55400	UG/KG		83	(70%-130%)	LXA1	11/26/18 14:21
**o-Terphenyl	664				501	UG/KG		75	(50%-150%)		
QC1204164338 MB											
Diesel Range Organics				U	2150	UG/KG					11/26/18 13:42
**o-Terphenyl	662				480	UG/KG		72	(50%-150%)		

QC Summary

Workorder: **464275**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics												
Batch 1824576												
QC1204164340 464511015 MS												
Diesel Range Organics	70900	U	2300		56300	UG/KG		79	(70%-130%)	LXA1	11/26/18	16:56
**o-Terphenyl	709		482		520	UG/KG		73	(50%-150%)			
QC1204164341 464511015 MSD												
Diesel Range Organics	70900	U	2300		59900	UG/KG	6	85	(0%-20%)		11/26/18	17:35
**o-Terphenyl	709		482		557	UG/KG		79	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL464275

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204161726	MB for batch 1823435	69
1204161727	LCS for batch 1823435	82
464275004	B3KL66A	68
464275006	B3KL79A	62
464275008	B3KL80A	57
464275010	B3KL84A	54
1204161730	B3KL67AMS	66
1204161731	B3KL67AMSD	58
1204164338	MB for batch 1824575	72
1204164339	LCS for batch 1824575	75
464275002	B3KL65A	62
1204164340	B3KL74AMS	73
1204164341	B3KL74AMSD	79

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 23, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464275**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1824012										
QC1204163098 LCS										
Gasoline Range Organics	500			617	UG/KG		123	(70%-130%)	JP1	11/19/18 12:07
**Bromofluorobenzene	50.0			45.8	UG/KG		92	(50%-150%)		
QC1204163096 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/19/18 12:35
**Bromofluorobenzene	50.0			42.8	UG/KG		86	(50%-150%)		
QC1204163099 464275002 PS										
Gasoline Range Organics	500	U	0.00	473	ug/L		95	(70%-130%)		11/19/18 17:03
**Bromofluorobenzene	50.0		43.5	38.3	ug/L		77	(50%-150%)		
QC1204163100 464275002 PSD										
Gasoline Range Organics	500	U	0.00	475	ug/L	0	95	(0%-20%)		11/19/18 17:32
**Bromofluorobenzene	50.0		43.5	37.1	ug/L		74	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

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- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **464275**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464275

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204163098	LCS for batch 1824011	92
1204163096	MB for batch 1824011	86
464275002	B3KL65A	87
464275004	B3KL66A	81
464275006	B3KL79A	86
464275008	B3KL80A	85
464275010	B3KL84A	87
1204163099	B3KL65APS	77
1204163100	B3KL65APSD	74

Surrogate	Acceptance Limits
BFB = Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 27, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464511**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1823436											
QC1204161727 LCS											
Diesel Range Organics	66500				58200	UG/KG		87	(70%-130%)	LXA1	11/17/18 14:56
**o-Terphenyl	665				544	UG/KG		82	(50%-150%)		
QC1204161726 MB											
Diesel Range Organics				U	2150	UG/KG					11/17/18 14:17
**o-Terphenyl	661				453	UG/KG		69	(50%-150%)		
QC1204161730 464511010 MS											
Diesel Range Organics	68700	TU	2220		48100	UG/KG		70	(70%-130%)		11/17/18 22:02
**o-Terphenyl	687		384		456	UG/KG		66	(50%-150%)		
QC1204161731 464511010 MSD											
Diesel Range Organics	68200	TU	2220	T	42900	UG/KG	11	63*	(0%-20%)		11/17/18 22:41
**o-Terphenyl	682		384		397	UG/KG		58	(50%-150%)		
Batch 1824576											
QC1204164339 LCS											
Diesel Range Organics	66400				55400	UG/KG		83	(70%-130%)	LXA1	11/26/18 14:21
**o-Terphenyl	664				501	UG/KG		75	(50%-150%)		
QC1204164338 MB											
Diesel Range Organics				U	2150	UG/KG					11/26/18 13:42
**o-Terphenyl	662				480	UG/KG		72	(50%-150%)		

QC Summary

Workorder: **464511**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics												
Batch 1824576												
QC1204164340 464511015 MS												
Diesel Range Organics	70900	U	2300		56300	UG/KG		79	(70%-130%)	LXA1	11/26/18	16:56
**o-Terphenyl	709		482		520	UG/KG		73	(50%-150%)			
QC1204164341 464511015 MSD												
Diesel Range Organics	70900	U	2300		59900	UG/KG	6	85	(0%-20%)		11/26/18	17:35
**o-Terphenyl	709		482		557	UG/KG		79	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL464511

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204161726	MB for batch 1823435	69
1204161727	LCS for batch 1823435	82
464511010	B3KL67A	56
1204161730	B3KL67AMS	66
1204161731	B3KL67AMSD	58
464511012	B3KL71A	64
464511013	B3KL72A	51
464511014	B3KL73A	62
464511017	B3KL76A	71
464511018	B3KL85A	55
1204164338	MB for batch 1824575	72
1204164339	LCS for batch 1824575	75
464511011	B3KL70A	73
464511015	B3KL74A	68
1204164340	B3KL74AMS	73
1204164341	B3KL74AMSD	79
464511016	B3KL75A	77

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464511**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1824048										
QC1204163193 LCS										
Gasoline Range Organics	500			617	UG/KG		123	(70%-130%)	JP1	11/19/18 12:07
**Bromofluorobenzene	50.0			45.8	UG/KG		92	(50%-150%)		
QC1204163192 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/19/18 12:35
**Bromofluorobenzene	50.0			42.8	UG/KG		86	(50%-150%)		
QC1204163194 464511010 PS										
Gasoline Range Organics	500	U	0.00	490	ug/L		98	(70%-130%)		11/19/18 22:13
**Bromofluorobenzene	50.0		42.3	40.5	ug/L		81	(50%-150%)		
QC1204163195 464511010 PSD										
Gasoline Range Organics	500	U	0.00	454	ug/L	8	91	(0%-20%)		11/19/18 22:42
**Bromofluorobenzene	50.0		42.3	39.5	ug/L		79	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **464511**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464511

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204163193	LCS for batch 1824047	92
1204163192	MB for batch 1824047	86
464511010	B3KL67A	85
464511011	B3KL70A	76
464511012	B3KL71A	81
464511013	B3KL72A	76
464511014	B3KL73A	76
464511015	B3KL74A	78
464511016	B3KL75A	77
464511017	B3KL76A	83
464511018	B3KL85A	77
1204163194	B3KL67APS	81
1204163195	B3KL67APSD	79

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 20, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464549**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1823440											
QC1204161733 LCS											
Diesel Range Organics	66700				57500	UG/KG		86	(70%-130%)	LXA1	11/18/18 06:26
**o-Terphenyl	667				556	UG/KG		83	(50%-150%)		
QC1204161732 MB											
Diesel Range Organics				U	2160	UG/KG					11/18/18 05:47
**o-Terphenyl	666				485	UG/KG		73	(50%-150%)		
QC1204161734 464549002 MS											
Diesel Range Organics	69000	DU	11200	D	53000	UG/KG		77	(70%-130%)		11/18/18 07:43
**o-Terphenyl	690		452		516	UG/KG		75	(50%-150%)		
QC1204161735 464549002 MSD											
Diesel Range Organics	69000	DU	11200	D	64200	UG/KG	19	93	(0%-20%)		11/18/18 08:22
**o-Terphenyl	690		452		562	UG/KG		82	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **464549**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL464549

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC	
1204161732	MB for batch 1823437	73	
1204161733	LCS for batch 1823437	83	
464549002	B3KL77A	65	D
1204161734	B3KL77AMS	75	D
1204161735	B3KL77AMSD	82	D
464549004	B3KL78A	79	
464549006	B3KL81A	87	
464549008	B3KL82A	75	D
464549010	B3KL83A	72	

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 29, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464549**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1825513										
QC1204166402 LCS										
Gasoline Range Organics	500			382	UG/KG		76	(70%-130%)	RXY1	11/26/18 12:36
**Bromofluorobenzene	50.0			34.7	UG/KG		69	(50%-150%)		
QC1204166400 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/26/18 13:04
**Bromofluorobenzene	50.0			31.2	UG/KG		62	(50%-150%)		
QC1204166404 464549004 PS										
Gasoline Range Organics	500 U	0.00		401	ug/L		80	(70%-130%)		11/26/18 22:33
**Bromofluorobenzene	50.0	31.5		25.8	ug/L		52	(50%-150%)		
QC1204166406 464549004 PSD										
Gasoline Range Organics	500 U	0.00		359	ug/L	11	72	(0%-20%)		11/26/18 23:01
**Bromofluorobenzene	50.0	31.5		31.0	ug/L		62	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **464549**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464549

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204166402	LCS for batch 1825511	69
1204166400	MB for batch 1825511	62
464549002	B3KL77A	63
464549004	B3KL78A	63
464549006	B3KL81A	65
464549008	B3KL82A	66
464549010	B3KL83A	74
1204166404	B3KL78APS	52
1204166406	B3KL78APSD	62

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 08 January 2018
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL31839-1, SL31884-1 and SL31887-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31839-1, SL31884-1 and SL31887-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3KL65	11/12/18	Soil	C	8081B
B3KL66	11/12/18	Soil	C	8081B
B3KL79	11/12/18	Soil	C	8081B
B3KL80	11/12/18	Soil	C	8081B
B3KL84	11/12/18	Soil	C	8081B
B3KL67	11/13/18	Soil	C	8081B
B3KL70	11/13/18	Soil	C	8081B
B3KL71	11/13/18	Soil	C	8081B
B3KL72	11/13/18	Soil	C	8081B
B3KL73	11/13/18	Soil	C	8081B
B3KL74	11/13/18	Soil	C	8081B
B3KL75	11/13/18	Soil	C	8081B
B3KL76	11/13/18	Soil	C	8081B
B3KL85	11/13/18	Soil	C	8081B
B3KL78	11/14/18	Soil	C	8081B
B3KL82	11/14/18	Soil	C	8081B
B3KL83	11/14/18	Soil	C	8081B
B3KL81	11/14/18	Soil	C	8081B
B3KL77	11/14/18	Soil	C	8081B

Data validation was conducted in accordance with the CHPRC validation statement of work and Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to ≤6 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31839-1, the MS and MSD recoveries for endosulfan I and endosulfan II were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and

should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL31884-1, the MS and MSD recoveries for endosulfan II were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL31887-1, the MS and MSD recoveries for endosulfan I and endosulfan II were below the lower acceptance limit but ≥ 20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL31839-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL31887-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that LCS analysis was not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for pesticides with the exception of 4,4-DDD, 4,4-DDE, 4,4-DDT and dieldrin were not provided in the SAP.

- **Completeness**

SDGs SL31839-1, SL31884-1 and SL31887-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification were due to matrix spike and LCS infractions. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDG: SL31839-1, SL31884-1 SL31887-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Endosulfan I, Endosulfan II	UJ	B3KL65, B3KL66, B3KL79, B3KL80, B3KL84, B3LK78, B3KL82, B3KL83, B3KL81, B3KL77	Low matrix spike recoveries and low LCS recoveries
Endosulfan II	UJ	B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85,	Low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/08/19	
			SDG: SL31839-1, SL31884-1, SL31887-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31839-1: B3KL65, B3KL66, B3KL79, B3KL80, B3KL84,					
SDG SL31884-1: B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85,					
SDG SL31887-1: B3KL78, B3KL82, B3KL83, B3KL81, B3KL77					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL31839-1: endosulfan I 46%/48%, endosulfan II 50%/50%

SL31884-1: endosulfan II 67%/68%

SL31887-1: endosulfan I 51%/46%; endosulfan II 54%/49%

LCS

SL31839-1: endosulfan I 49%; endosulfan II 52%

SL31887-1: endosulfan I 56%; endosulfan II 59%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for 4,4-DDD, 4,4-DDE, 4,4-DDT and dieldrin were met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31839-1
SDG: SL31839-1

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402649/1-A
Matrix: Solid
Analysis Batch: 403561

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402649

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
Toxaphene	23	U	67	23	ug/Kg		11/26/18 12:11	11/29/18 20:47	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/26/18 12:11	11/29/18 20:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*87*		*72 - 115*	*11/26/18 12:11*	*11/29/18 20:47*	*1*
Tetrachloro-m-xylene	*89*		*71 - 111*	*11/26/18 12:11*	*11/29/18 20:47*	*1*

Lab Sample ID: LCS 160-402649/2-A
Matrix: Solid
Analysis Batch: 403561

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.0		ug/Kg		90	72 - 117
4,4'-DDE	16.7	15.4		ug/Kg		92	75 - 104
4,4'-DDT	16.7	15.6		ug/Kg		94	72 - 119
Aldrin	16.7	14.9		ug/Kg		89	70 - 102
alpha-BHC	16.7	15.0		ug/Kg		90	72 - 111
alpha-Chlordane	16.7	15.0		ug/Kg		90	72 - 105
beta-BHC	16.7	18.7	o	ug/Kg		112	68 - 102
delta-BHC	16.7	14.5		ug/Kg		87	72 - 117
Dieldrin	16.7	15.5		ug/Kg		93	72 - 108
Endosulfan I	16.7	8.21		ug/Kg		49	34 - 96
Endosulfan II	16.7	8.69		ug/Kg		52	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	15.1		ug/Kg		90	76 - 116
Endrin aldehyde	16.7	13.5		ug/Kg		81	54 - 97
Endrin ketone	16.7	14.4		ug/Kg		87	71 - 113
gamma-BHC (Lindane)	16.7	14.7		ug/Kg		88	71 - 107
Heptachlor	16.7	14.2		ug/Kg		85	55 - 128

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-402649/2-A
Matrix: Solid
Analysis Batch: 403561

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	16.7	14.9		ug/Kg		90	72 - 107
Methoxychlor	16.7	15.2		ug/Kg		91	71 - 124
trans-Chlordane	16.7	15.2		ug/Kg		91	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Lab Sample ID: 160-31839-4 MS
Matrix: Soil
Analysis Batch: 403561

Client Sample ID: B3KL80
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.1	13.8		ug/Kg	☼	81	60 - 121
4,4'-DDE	2.0		17.1	16.3		ug/Kg	☼	84	63 - 111
4,4'-DDT	2.1	P	17.1	15.8		ug/Kg	☼	80	59 - 122
Aldrin	0.59	U	17.1	14.7		ug/Kg	☼	86	57 - 110
alpha-BHC	0.40	U	17.1	14.9		ug/Kg	☼	87	62 - 117
alpha-Chlordane	1.8	P	17.1	15.2		ug/Kg	☼	78	58 - 114
beta-BHC	0.47	U o N	17.1	18.5		ug/Kg	☼	108	61 - 108
delta-BHC	0.35	U	17.1	14.4		ug/Kg	☼	85	64 - 121
Dieldrin	0.22	U	17.1	15.1		ug/Kg	☼	89	57 - 114
Endosulfan I	0.59	U	17.1	7.87		ug/Kg	☼	46	31 - 89
Endosulfan II	0.30	U	17.1	8.52		ug/Kg	☼	50	40 - 93
Endosulfan sulfate	0.35	U	17.1	14.2		ug/Kg	☼	83	56 - 112
Endrin	0.34	U	17.1	14.6		ug/Kg	☼	85	64 - 125
Endrin aldehyde	0.40	U	17.1	13.2		ug/Kg	☼	77	45 - 101
Endrin ketone	0.43	U	17.1	14.0		ug/Kg	☼	82	59 - 115
gamma-BHC (Lindane)	0.49	U	17.1	14.7		ug/Kg	☼	86	61 - 113
Heptachlor	0.29	U	17.1	13.9		ug/Kg	☼	82	33 - 150
Heptachlor epoxide	0.49	U	17.1	14.9		ug/Kg	☼	87	60 - 114
Methoxychlor	0.85	U	17.1	14.1		ug/Kg	☼	83	58 - 130
trans-Chlordane	2.4		17.1	15.5		ug/Kg	☼	77	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Lab Sample ID: 160-31839-4 MSD
Matrix: Soil
Analysis Batch: 403561

Client Sample ID: B3KL80
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.3	15.1		ug/Kg	☼	87	60 - 121	9	30
4,4'-DDE	2.0		17.3	17.1		ug/Kg	☼	88	63 - 111	5	30
4,4'-DDT	2.1	P	17.3	17.0		ug/Kg	☼	86	59 - 122	7	30
Aldrin	0.59	U	17.3	15.1		ug/Kg	☼	88	57 - 110	3	30
alpha-BHC	0.40	U	17.3	15.2		ug/Kg	☼	88	62 - 117	2	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31839-4 MSD
Matrix: Soil
Analysis Batch: 403561

Client Sample ID: B3KL80
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.8	P	17.3	16.2		ug/Kg	☼	83	58 - 114	7	30
beta-BHC	0.47	U o N	17.3	19.2	N	ug/Kg	☼	111	61 - 108	4	30
delta-BHC	0.35	U	17.3	14.9		ug/Kg	☼	86	64 - 121	3	30
Dieldrin	0.22	U	17.3	15.8		ug/Kg	☼	91	57 - 114	4	30
Endosulfan I	0.59	U	17.3	8.25		ug/Kg	☼	48	31 - 89	5	30
Endosulfan II	0.30	U	17.3	8.62		ug/Kg	☼	50	40 - 93	1	30
Endosulfan sulfate	0.35	U	17.3	15.1		ug/Kg	☼	88	56 - 112	7	30
Endrin	0.34	U	17.3	15.2		ug/Kg	☼	88	64 - 125	4	30
Endrin aldehyde	0.40	U	17.3	14.2		ug/Kg	☼	82	45 - 101	7	30
Endrin ketone	0.43	U	17.3	15.4		ug/Kg	☼	89	59 - 115	9	30
gamma-BHC (Lindane)	0.49	U	17.3	15.0		ug/Kg	☼	87	61 - 113	2	30
Heptachlor	0.29	U	17.3	14.4		ug/Kg	☼	83	33 - 150	3	30
Heptachlor epoxide	0.49	U	17.3	15.5		ug/Kg	☼	90	60 - 114	4	30
Methoxychlor	0.85	U	17.3	15.6		ug/Kg	☼	90	58 - 130	10	30
trans-Chlordane	2.4		17.3	16.5		ug/Kg	☼	82	62 - 114	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*72 - 115*
Tetrachloro-m-xylene	*88*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-401052/1-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401052

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1248	11	U	33	11	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1254	13	U	33	13	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1260	10	U	33	10	ug/Kg		11/14/18 16:48	11/19/18 21:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*125*		*23 - 146*	*11/14/18 16:48*	*11/19/18 21:28*	*1*

Lab Sample ID: LCS 160-401052/2-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		87	52 - 134
Aroclor 1260	167	150		ug/Kg		90	50 - 132

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31839-1
SDG: SL31839-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31839-1	B3KL65	86	87
160-31839-2	B3KL66	97	83
160-31839-4	B3KL80	94	90
160-31839-4 MS	B3KL80	84	85
160-31839-4 MSD	B3KL80	91	88
160-31839-5	B3KL84	96	93

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX1 (71-111)
160-31839-3	B3KL79	87	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
LCS 160-402649/2-A	Lab Control Sample	90	92
MB 160-402649/1-A	Method Blank	87	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	DCB1 (23-146)
160-31839-1	B3KL65	91
160-31839-2	B3KL66	96
160-31839-3	B3KL79	96
160-31839-3 MS	B3KL79	102
160-31839-3 MSD	B3KL79	92
160-31839-4	B3KL80	108
160-31839-5	B3KL84	92

Surrogate Legend

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-10 MSD
Matrix: Soil
Analysis Batch: 403813

Client Sample ID: B3KL92
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoranthene - DL	530	U D	3520	3070	J D	ug/Kg	☼	87	45 - 109	3	30
Fluorene - DL	480	U D	3520	2980	J D	ug/Kg	☼	85	45 - 109	9	30
Hexachlorobenzene - DL	440	U D	3520	2360	J D	ug/Kg	☼	67	48 - 113	5	30
Hexachlorobutadiene - DL	420	U D	3520	2660	J D	ug/Kg	☼	75	48 - 109	4	30
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144	NC	30
Hexachloroethane - DL	360	U D	3520	2270	J D	ug/Kg	☼	64	44 - 102	6	30
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	3130	J D	ug/Kg	☼	89	30 - 136	5	30
Isophorone - DL	390	U D	3520	2500	J D	ug/Kg	☼	71	48 - 100	16	30
Naphthalene - DL	370	U D	3520	2700	J D	ug/Kg	☼	77	54 - 98	8	30
Nitrobenzene - DL	420	U D	3520	2740	J D	ug/Kg	☼	78	51 - 106	11	30
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2560	J D	ug/Kg	☼	73	47 - 104	4	30
Diphenylamine + N-Nitrosodiphenylamine - DL	350	U D	3520	3220	J D	ug/Kg	☼	91	33 - 140	5	30
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116	NC	30
Phenanthrene - DL	450	U D	3520	2890	J D	ug/Kg	☼	82	53 - 106	7	30
Phenol - DL	400	U D	3520	2590	J D	ug/Kg	☼	73	41 - 100	8	30
Pyrene - DL	770	U D	3520	3140	J D	ug/Kg	☼	89	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*57*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*75*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*87*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-401823/1-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-401823/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403642 — **Prep Batch: 401823**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Toxaphene	23	U	67	23	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*99*		*72 - 115*	*11/20/18 10:04*	*11/30/18 17:38*	*1*
Tetrachloro-m-xylene	*91*		*71 - 111*	*11/20/18 10:04*	*11/30/18 17:38*	*1*

Lab Sample ID: LCS 160-401823/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403642 — **Prep Batch: 401823**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	18.1		ug/Kg		108	72 - 117
4,4'-DDE	16.7	17.4		ug/Kg		104	75 - 104
4,4'-DDT	16.7	18.5		ug/Kg		111	72 - 119
Aldrin	16.7	16.2		ug/Kg		97	70 - 102
alpha-BHC	16.7	15.9		ug/Kg		96	72 - 111
alpha-Chlordane	16.7	16.8		ug/Kg		101	72 - 105
beta-BHC	16.7	20.6	o	ug/Kg		124	68 - 102
delta-BHC	16.7	17.4		ug/Kg		104	72 - 117
Dieldrin	16.7	17.4		ug/Kg		104	72 - 108
Endosulfan I	16.7	12.9		ug/Kg		77	34 - 96
Endosulfan II	16.7	13.6		ug/Kg		82	46 - 96
Endosulfan sulfate	16.7	17.1		ug/Kg		103	68 - 108
Endrin	16.7	17.1		ug/Kg		103	76 - 116
Endrin aldehyde	16.7	16.1		ug/Kg		97	54 - 97
Endrin ketone	16.7	17.6		ug/Kg		105	71 - 113
gamma-BHC (Lindane)	16.7	15.9		ug/Kg		95	71 - 107
Heptachlor	16.7	15.2		ug/Kg		91	55 - 128
Heptachlor epoxide	16.7	16.5		ug/Kg		99	72 - 107
Methoxychlor	16.7	18.7		ug/Kg		112	71 - 124
trans-Chlordane	16.7	16.9		ug/Kg		101	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*106*		*72 - 115*
Tetrachloro-m-xylene	*94*		*71 - 111*

Lab Sample ID: 160-31884-7 MS — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403642 — **Prep Batch: 401823**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.3	15.4		ug/Kg	☼	89	60 - 121

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31884-7 MS
Matrix: Soil
Analysis Batch: 403642

Client Sample ID: B3KL75
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDE	2.2		17.3	18.4		ug/Kg	☼	93	63 - 111
4,4'-DDT	0.87	J	17.3	17.0		ug/Kg	☼	93	59 - 122
Aldrin	0.59	U	17.3	14.9		ug/Kg	☼	86	57 - 110
alpha-BHC	0.40	U	17.3	15.1		ug/Kg	☼	87	62 - 117
alpha-Chlordane	3.9	P	17.3	19.5		ug/Kg	☼	90	58 - 114
beta-BHC	0.48	U o N	17.3	18.6		ug/Kg	☼	108	61 - 108
delta-BHC	0.35	U	17.3	16.0		ug/Kg	☼	93	64 - 121
Dieldrin	0.22	U	17.3	16.0		ug/Kg	☼	92	57 - 114
Endosulfan I	0.59	U	17.3	12.3		ug/Kg	☼	71	31 - 89
Endosulfan II	0.30	U	17.3	11.6		ug/Kg	☼	67	40 - 93
Endosulfan sulfate	0.35	U	17.3	14.7		ug/Kg	☼	85	56 - 112
Endrin	0.34	U	17.3	15.3		ug/Kg	☼	88	64 - 125
Endrin aldehyde	0.40	U	17.3	14.3		ug/Kg	☼	82	45 - 101
Endrin ketone	0.43	U	17.3	15.2		ug/Kg	☼	88	59 - 115
gamma-BHC (Lindane)	0.50	U	17.3	14.8		ug/Kg	☼	85	61 - 113
Heptachlor	0.29	U	17.3	13.9		ug/Kg	☼	80	33 - 150
Heptachlor epoxide	0.49	U	17.3	17.3		ug/Kg	☼	100	60 - 114
Methoxychlor	0.86	U	17.3	15.9		ug/Kg	☼	92	58 - 130
trans-Chlordane	4.1		17.3	18.7		ug/Kg	☼	85	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Lab Sample ID: 160-31884-7 MSD
Matrix: Soil
Analysis Batch: 403642

Client Sample ID: B3KL75
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.3	15.4		ug/Kg	☼	89	60 - 121	0	30
4,4'-DDE	2.2		17.3	17.9		ug/Kg	☼	90	63 - 111	3	30
4,4'-DDT	0.87	J	17.3	17.2		ug/Kg	☼	95	59 - 122	1	30
Aldrin	0.59	U	17.3	15.3		ug/Kg	☼	89	57 - 110	3	30
alpha-BHC	0.40	U	17.3	15.7		ug/Kg	☼	91	62 - 117	4	30
alpha-Chlordane	3.9	P	17.3	19.9		ug/Kg	☼	92	58 - 114	2	30
beta-BHC	0.48	U o N	17.3	19.5	N	ug/Kg	☼	113	61 - 108	4	30
delta-BHC	0.35	U	17.3	16.4		ug/Kg	☼	95	64 - 121	2	30
Dieldrin	0.22	U	17.3	16.2		ug/Kg	☼	94	57 - 114	1	30
Endosulfan I	0.59	U	17.3	12.7		ug/Kg	☼	74	31 - 89	3	30
Endosulfan II	0.30	U	17.3	11.7		ug/Kg	☼	68	40 - 93	1	30
Endosulfan sulfate	0.35	U	17.3	14.9		ug/Kg	☼	86	56 - 112	2	30
Endrin	0.34	U	17.3	15.5		ug/Kg	☼	90	64 - 125	1	30
Endrin aldehyde	0.40	U	17.3	14.5		ug/Kg	☼	84	45 - 101	2	30
Endrin ketone	0.43	U	17.3	15.4		ug/Kg	☼	89	59 - 115	1	30
gamma-BHC (Lindane)	0.50	U	17.3	15.3		ug/Kg	☼	88	61 - 113	3	30
Heptachlor	0.29	U	17.3	14.5		ug/Kg	☼	84	33 - 150	4	30
Heptachlor epoxide	0.49	U	17.3	18.0		ug/Kg	☼	104	60 - 114	4	30
Methoxychlor	0.86	U	17.3	16.4		ug/Kg	☼	95	58 - 130	3	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31884-7 MSD — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403642 — **Prep Batch: 401823**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-Chlordane	4.1		17.3	19.0		ug/Kg	☼	86	62 - 114	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-401897/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1248	11	U	33	11	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1254	13	U	33	13	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1260	10	U	33	10	ug/Kg		11/20/18 13:55	11/26/18 18:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*96*		*23 - 146*	*11/20/18 13:55*	*11/26/18 18:13*	*1*

Lab Sample ID: LCS 160-401897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	140		ug/Kg		84	52 - 134
Aroclor 1260	167	156		ug/Kg		94	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*

Lab Sample ID: 160-31884-7 MS — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	173	138		ug/Kg	☼	80	23 - 140
Aroclor 1260	10	U	173	169		ug/Kg	☼	98	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*95*		*23 - 146*

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-401921/2-A	Lab Control Sample	80	77	76	75	78	82
MB 160-401921/1-A	Method Blank	69	80	76	67	75	82

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-1	B3KL67	94	77

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-2	B3KL70	98	85
160-31884-6	B3KL74	90	85
160-31884-7	B3KL75	96	87
160-31884-7 MSD	B3KL75	86	85
160-31884-9	B3KL85	97	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-3	B3KL71	99	84
160-31884-4	B3KL72	98	82
160-31884-5	B3KL73	92	80
160-31884-8	B3KL76	98	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-7 MS	B3KL75	89	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-401823/2-A	Lab Control Sample	106	94
MB 160-401823/1-A	Method Blank	99	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-31884-1	B3KL67	74
160-31884-2	B3KL70	88
160-31884-3	B3KL71	83
160-31884-4	B3KL72	79
160-31884-5	B3KL73	85
160-31884-6	B3KL74	83
160-31884-7	B3KL75	98
160-31884-7 MS	B3KL75	95
160-31884-7 MSD	B3KL75	85
160-31884-8	B3KL76	82

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31887-1 MSD
Matrix: Soil
Analysis Batch: 403774

Client Sample ID: B3KL99
Prep Type: Total/NA
Prep Batch: 402826

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoranthene - DL	860	J D	3460	2960	D	ug/Kg	☼	61	45 - 109	3	30
Fluorene - DL	240	U D	3460	2830	D	ug/Kg	☼	82	45 - 109	2	30
Hexachlorobenzene - DL	220	U D	3460	2720	D	ug/Kg	☼	79	48 - 113	2	30
Hexachlorobutadiene - DL	210	U D	3460	2560	D	ug/Kg	☼	74	48 - 109	4	30
Hexachlorocyclopentadiene - DL	1700	U D	3460	2200	J D	ug/Kg	☼	64	21 - 144	1	30
Hexachloroethane - DL	180	U D	3460	2370	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	330	U D	3460	3430	D	ug/Kg	☼	99	30 - 136	8	30
Isophorone - DL	190	U D	3460	2370	D	ug/Kg	☼	69	48 - 100	1	30
Naphthalene - DL	180	U D	3460	2590	D	ug/Kg	☼	75	54 - 98	5	30
Nitrobenzene - DL	210	U D	3460	2730	D	ug/Kg	☼	79	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3460	2550	D	ug/Kg	☼	74	47 - 104	2	30
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3460	3360	D	ug/Kg	☼	97	33 - 140	2	30
Pentachlorophenol - DL	1700	U D	3460	2540	J D	ug/Kg	☼	73	23 - 116	0	30
Phenanthrene - DL	790	J D	3460	2910	D	ug/Kg	☼	61	53 - 106	1	30
Phenol - DL	200	U D	3460	2730	D	ug/Kg	☼	79	41 - 100	6	30
Pyrene - DL	580	J D	3460	2840	D	ug/Kg	☼	66	39 - 130	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*78*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*75*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*72*		*44 - 120*
Phenol-d5 (Surr) - DL	*76*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*82*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-402188/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Toxaphene	23	U	67	23	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*105*		*72 - 115*	*11/21/18 13:23*	*12/09/18 13:29*	*1*
Tetrachloro-m-xylene	*95*		*71 - 111*	*11/21/18 13:23*	*12/09/18 13:29*	*1*

Lab Sample ID: LCS 160-402188/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	17.6		ug/Kg		106	72 - 117
4,4'-DDE	16.7	17.6	o	ug/Kg		105	75 - 104
4,4'-DDT	16.7	18.1		ug/Kg		109	72 - 119
Aldrin	16.7	16.2		ug/Kg		97	70 - 102
alpha-BHC	16.7	16.1		ug/Kg		97	72 - 111
alpha-Chlordane	16.7	16.5		ug/Kg		99	72 - 105
beta-BHC	16.7	20.6	o	ug/Kg		123	68 - 102
delta-BHC	16.7	16.3		ug/Kg		98	72 - 117
Dieldrin	16.7	17.1		ug/Kg		103	72 - 108
Endosulfan I	16.7	9.27		ug/Kg		56	34 - 96
Endosulfan II	16.7	9.84		ug/Kg		59	46 - 96
Endosulfan sulfate	16.7	17.0		ug/Kg		102	68 - 108
Endrin	16.7	16.8		ug/Kg		101	76 - 116
Endrin aldehyde	16.7	16.1		ug/Kg		96	54 - 97
Endrin ketone	16.7	17.2		ug/Kg		103	71 - 113
gamma-BHC (Lindane)	16.7	16.1		ug/Kg		96	71 - 107
Heptachlor	16.7	15.2		ug/Kg		91	55 - 128
Heptachlor epoxide	16.7	16.5		ug/Kg		99	72 - 107
Methoxychlor	16.7	18.0		ug/Kg		108	71 - 124
trans-Chlordane	16.7	16.8		ug/Kg		101	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*104*		*72 - 115*
Tetrachloro-m-xylene	*99*		*71 - 111*

Lab Sample ID: 160-31887-5 MS — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.6	15.9		ug/Kg	☼	90	60 - 121

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-5 MS
Matrix: Soil
Analysis Batch: 404777

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDE	2.3	o	17.6	19.6		ug/Kg	☼	98	63 - 111
4,4'-DDT	1.2	J	17.6	18.0		ug/Kg	☼	96	59 - 122
Aldrin	0.60	U	17.6	16.6		ug/Kg	☼	94	57 - 110
alpha-BHC	0.41	U	17.6	16.6		ug/Kg	☼	94	62 - 117
alpha-Chlordane	0.98	U	17.6	17.2		ug/Kg	☼	98	58 - 114
beta-BHC	0.48	U o N	17.6	20.9	N	ug/Kg	☼	119	61 - 108
delta-BHC	0.36	U	17.6	16.1		ug/Kg	☼	92	64 - 121
Dieldrin	0.22	U	17.6	17.0		ug/Kg	☼	97	57 - 114
Endosulfan I	0.60	U	17.6	9.01		ug/Kg	☼	51	31 - 89
Endosulfan II	0.30	U	17.6	9.44		ug/Kg	☼	54	40 - 93
Endosulfan sulfate	0.35	U	17.6	15.6		ug/Kg	☼	89	56 - 112
Endrin	0.35	U	17.6	16.5		ug/Kg	☼	94	64 - 125
Endrin aldehyde	0.41	U	17.6	15.0		ug/Kg	☼	85	45 - 101
Endrin ketone	0.44	U	17.6	16.1		ug/Kg	☼	92	59 - 115
gamma-BHC (Lindane)	0.50	U	17.6	16.4		ug/Kg	☼	93	61 - 113
Heptachlor	0.30	U	17.6	15.8		ug/Kg	☼	90	33 - 150
Heptachlor epoxide	0.50	U	17.6	16.7		ug/Kg	☼	95	60 - 114
Methoxychlor	0.86	U	17.6	16.9		ug/Kg	☼	96	58 - 130
trans-Chlordane	0.90	J	17.6	17.4		ug/Kg	☼	94	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*97*		*72 - 115*
Tetrachloro-m-xylene	*95*		*71 - 111*

Lab Sample ID: 160-31887-5 MSD
Matrix: Soil
Analysis Batch: 404777

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.4	14.3		ug/Kg	☼	82	60 - 121	10	30
4,4'-DDE	2.3	o	17.4	17.3		ug/Kg	☼	86	63 - 111	12	30
4,4'-DDT	1.2	J	17.4	17.0		ug/Kg	☼	91	59 - 122	6	30
Aldrin	0.60	U	17.4	14.8		ug/Kg	☼	85	57 - 110	11	30
alpha-BHC	0.41	U	17.4	15.2		ug/Kg	☼	88	62 - 117	9	30
alpha-Chlordane	0.98	U	17.4	15.6		ug/Kg	☼	90	58 - 114	10	30
beta-BHC	0.48	U o N	17.4	19.1	N	ug/Kg	☼	110	61 - 108	9	30
delta-BHC	0.36	U	17.4	14.9		ug/Kg	☼	86	64 - 121	8	30
Dieldrin	0.22	U	17.4	15.0		ug/Kg	☼	86	57 - 114	12	30
Endosulfan I	0.60	U	17.4	8.05		ug/Kg	☼	46	31 - 89	11	30
Endosulfan II	0.30	U	17.4	8.52		ug/Kg	☼	49	40 - 93	10	30
Endosulfan sulfate	0.35	U	17.4	13.9		ug/Kg	☼	80	56 - 112	11	30
Endrin	0.35	U	17.4	14.5		ug/Kg	☼	84	64 - 125	12	30
Endrin aldehyde	0.41	U	17.4	13.5		ug/Kg	☼	78	45 - 101	11	30
Endrin ketone	0.44	U	17.4	14.2		ug/Kg	☼	82	59 - 115	13	30
gamma-BHC (Lindane)	0.50	U	17.4	15.0		ug/Kg	☼	86	61 - 113	9	30
Heptachlor	0.30	U	17.4	14.1		ug/Kg	☼	81	33 - 150	12	30
Heptachlor epoxide	0.50	U	17.4	15.0		ug/Kg	☼	86	60 - 114	11	30
Methoxychlor	0.86	U	17.4	14.9		ug/Kg	☼	86	58 - 130	13	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-Chlordane	0.90	J	17.4	15.6		ug/Kg	☼	85	62 - 114	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*94*		*23 - 146*	*11/21/18 16:13*	*12/03/18 18:08*	*1*

Lab Sample ID: LCS 160-402292/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*

Lab Sample ID: 160-31887-6 MS — **Client Sample ID: B3KL82**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*82*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31887-1 - DL	B3KL99	71	81	75	64	78	84
160-31887-1 MS - DL	B3KL99	70	77	76	75	73	86
160-31887-1 MSD - DL	B3KL99	78	83	75	72	76	82
160-31887-3	B3KLB3	76	82	84	71	82	85
160-31887-4	B3KLB0	76	85	80	70	81	87
160-31887-8 - DL	B3KL95	65	75	78	67	80	84
160-31887-9	B3KL93	75	80	78	70	77	81
160-31887-10	B3KL96	76	82	80	71	80	84
160-31887-13	B3KLB5	80	85	83	70	83	89
160-31887-14 - DL	B3KLB4	61	74	74	65	72	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-402826/2-A	Lab Control Sample	82	84	85	85	83	88
MB 160-402826/1-A	Method Blank	74	88	81	72	79	93

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31887-5	B3KL78	101	93
160-31887-5 MS	B3KL78	97	95
160-31887-5 MSD	B3KL78	92	89
160-31887-6	B3KL82	92	87
160-31887-7	B3KL83	108	94
160-31887-15	B3KL81	92	90
160-31887-16	B3KL77	97	88

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	**Client Sample ID**	**DCB2 (72-115)**	**TCX2 (71-111)**
LCS 160-402188/2-A	Lab Control Sample	104	99
MB 160-402188/1-A	Method Blank	105	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**
160-31887-5	B3KL78	85
160-31887-6	B3KL82	85
160-31887-6 MS	B3KL82	82
160-31887-6 MSD	B3KL82	87
160-31887-7	B3KL83	83
160-31887-15	B3KL81	83
160-31887-16	B3KL77	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**
LCS 160-402292/2-A	Lab Control Sample	90
MB 160-402292/1-A	Method Blank	94

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 08 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL31839-1, SL31884-1, SL31887-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31839-1, SL31884-1 and SL31887-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3KL65	11/12/18	Soil	C	8082A
B3KL66	11/12/18	Soil	C	8082A
B3KL79	11/12/18	Soil	C	8082A
B3KL80	11/12/18	Soil	C	8082A
B3KL84	11/12/18	Soil	C	8082A
B3KL67	11/13/18	Soil	C	8082A
B3KL70	11/13/18	Soil	C	8082A
B3KL71	11/13/18	Soil	C	8082A
B3KL72	11/13/18	Soil	C	8082A
B3KL73	11/13/18	Soil	C	8082A
B3KL74	11/13/18	Soil	C	8082A
B3KL75	11/13/18	Soil	C	8082A
B3KL76	11/13/18	Soil	C	8082A
B3KL85	11/13/18	Soil	C	8082A
B3KL78	11/14/18	Soil	C	8082A
B3KL82	11/14/18	Soil	C	8082A
B3KL83	11/14/18	Soil	C	8082A
B3KL81	11/14/18	Soil	C	8082A
B3KL77	11/14/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within 1 year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

CRDLs for aroclor 1221, aroclor 1232, aroclor 1242, aroclor 1248 were not provided in the SAP.

- **Completeness**

SDGs SL31839-1, SL31884-1 and SL31887-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL31839-1, SL31884-1, SL31887-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/08/19	
			SDG: SL31839-1, SL31884-1, SL31887-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31839-1: B3KL65, B3KL66, B3KL79, B3KL80, B3KL84					
SDG SL31884-1: B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85					
SDG SL31887-1: B3KL78, B3KL82, B3KL83, B3KL81, B3KL77					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes) No N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No (N/A)
Positive results resolved acceptably?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for arclor 1016, aroclor 1254 and arclor 1260 were provided. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31839-4 MSD
Matrix: Soil
Analysis Batch: 403561

Client Sample ID: B3KL80
Prep Type: Total/NA
Prep Batch: 402649

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.8	P	17.3	16.2		ug/Kg	☼	83	58 - 114	7	30
beta-BHC	0.47	U o N	17.3	19.2	N	ug/Kg	☼	111	61 - 108	4	30
delta-BHC	0.35	U	17.3	14.9		ug/Kg	☼	86	64 - 121	3	30
Dieldrin	0.22	U	17.3	15.8		ug/Kg	☼	91	57 - 114	4	30
Endosulfan I	0.59	U	17.3	8.25		ug/Kg	☼	48	31 - 89	5	30
Endosulfan II	0.30	U	17.3	8.62		ug/Kg	☼	50	40 - 93	1	30
Endosulfan sulfate	0.35	U	17.3	15.1		ug/Kg	☼	88	56 - 112	7	30
Endrin	0.34	U	17.3	15.2		ug/Kg	☼	88	64 - 125	4	30
Endrin aldehyde	0.40	U	17.3	14.2		ug/Kg	☼	82	45 - 101	7	30
Endrin ketone	0.43	U	17.3	15.4		ug/Kg	☼	89	59 - 115	9	30
gamma-BHC (Lindane)	0.49	U	17.3	15.0		ug/Kg	☼	87	61 - 113	2	30
Heptachlor	0.29	U	17.3	14.4		ug/Kg	☼	83	33 - 150	3	30
Heptachlor epoxide	0.49	U	17.3	15.5		ug/Kg	☼	90	60 - 114	4	30
Methoxychlor	0.85	U	17.3	15.6		ug/Kg	☼	90	58 - 130	10	30
trans-Chlordane	2.4		17.3	16.5		ug/Kg	☼	82	62 - 114	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*72 - 115*
Tetrachloro-m-xylene	*88*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-401052/1-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401052

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1248	11	U	33	11	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1254	13	U	33	13	ug/Kg		11/14/18 16:48	11/19/18 21:28	1
Aroclor 1260	10	U	33	10	ug/Kg		11/14/18 16:48	11/19/18 21:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*125*		*23 - 146*	*11/14/18 16:48*	*11/19/18 21:28*	*1*

Lab Sample ID: LCS 160-401052/2-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		87	52 - 134
Aroclor 1260	167	150		ug/Kg		90	50 - 132

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-401052/2-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401052

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*83*		*23 - 146*

Lab Sample ID: 160-31839-3 MS
Matrix: Soil
Analysis Batch: 401719

Client Sample ID: B3KL79
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	173		ug/Kg	☼	97	23 - 140
Aroclor 1260	11	U	178	183		ug/Kg	☼	103	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*23 - 146*

Lab Sample ID: 160-31839-3 MSD
Matrix: Soil
Analysis Batch: 401719

Client Sample ID: B3KL79
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	176	164		ug/Kg	☼	93	23 - 140	5	30
Aroclor 1260	11	U	176	173		ug/Kg	☼	98	20 - 131	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401270/1-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401270

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/16/18 11:12	11/20/18 03:07	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/16/18 11:12	11/20/18 03:07	1

Lab Sample ID: LCS 160-401270/2-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401270

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.53	9.60		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-401270/3-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401270

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	78.46	D	mg/Kg		85.7	53.5 - 124.5

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31839-1
SDG: SL31839-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31839-1	B3KL65	86	87
160-31839-2	B3KL66	97	83
160-31839-4	B3KL80	94	90
160-31839-4 MS	B3KL80	84	85
160-31839-4 MSD	B3KL80	91	88
160-31839-5	B3KL84	96	93

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31839-3	B3KL79	87	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-402649/2-A	Lab Control Sample	90	92
MB 160-402649/1-A	Method Blank	87	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-31839-1	B3KL65	91
160-31839-2	B3KL66	96
160-31839-3	B3KL79	96
160-31839-3 MS	B3KL79	102
160-31839-3 MSD	B3KL79	92
160-31839-4	B3KL80	108
160-31839-5	B3KL84	92

Surrogate Legend

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31839-1
SDG: SL31839-1

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
LCS 160-401052/2-A	Lab Control Sample	83							
MB 160-401052/1-A	Method Blank	125							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31884-7 MSD — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403642 — **Prep Batch: 401823**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-Chlordane	4.1		17.3	19.0		ug/Kg	☼	86	62 - 114	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-401897/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1248	11	U	33	11	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1254	13	U	33	13	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1260	10	U	33	10	ug/Kg		11/20/18 13:55	11/26/18 18:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*96*		*23 - 146*	*11/20/18 13:55*	*11/26/18 18:13*	*1*

Lab Sample ID: LCS 160-401897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	140		ug/Kg		84	52 - 134
Aroclor 1260	167	156		ug/Kg		94	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*

Lab Sample ID: 160-31884-7 MS — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	173	138		ug/Kg	☼	80	23 - 140
Aroclor 1260	10	U	173	169		ug/Kg	☼	98	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*95*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31884-7 MSD — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	171	139		ug/Kg	☼	81	23 - 140	1	30
Aroclor 1260	10	U	171	145		ug/Kg	☼	85	20 - 131	15	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401976/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/20/18 19:46	11/30/18 15:54	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/20/18 19:46	11/30/18 15:54	1

Lab Sample ID: LCS 160-401976/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.89	9.31		mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-401976/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	73.20	D	mg/Kg		79.9	53.5 - 124.5

Lab Sample ID: 160-31884-1 MS — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U D N	18.9	5.09	B D N	mg/Kg	☼	27	75 - 125
Lithium	6.7	B D	9.46	16.97	D	mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-31884-1 MSD — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U D N	19.6	5.49	B D N	mg/Kg	☼	28	75 - 125	8	30
Lithium	6.7	B D	9.81	16.94	D	mg/Kg	☼	105	75 - 125	0	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-3	B3KL71	99	84
160-31884-4	B3KL72	98	82
160-31884-5	B3KL73	92	80
160-31884-8	B3KL76	98	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-7 MS	B3KL75	89	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-401823/2-A	Lab Control Sample	106	94
MB 160-401823/1-A	Method Blank	99	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-31884-1	B3KL67	74
160-31884-2	B3KL70	88
160-31884-3	B3KL71	83
160-31884-4	B3KL72	79
160-31884-5	B3KL73	85
160-31884-6	B3KL74	83
160-31884-7	B3KL75	98
160-31884-7 MS	B3KL75	95
160-31884-7 MSD	B3KL75	85
160-31884-8	B3KL76	82

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
160-31884-9	B3KL85	86							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
LCS 160-401897/2-A	Lab Control Sample	91							
MB 160-401897/1-A	Method Blank	96							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-Chlordane	0.90	J	17.4	15.6		ug/Kg	☼	85	62 - 114	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*94*		*23 - 146*	*11/21/18 16:13*	*12/03/18 18:08*	*1*

Lab Sample ID: LCS 160-402292/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*

Lab Sample ID: 160-31887-6 MS — **Client Sample ID: B3KL82**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*82*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31887-6 MSD — **Client Sample ID: B3KL82**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401976/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/20/18 19:46	11/30/18 15:54	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/20/18 19:46	11/30/18 15:54	1

Lab Sample ID: LCS 160-401976/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.89	9.31		mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-401976/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	73.20	D	mg/Kg		79.9	53.5 - 124.5

Lab Sample ID: 160-31887-5 MS — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.1	U D N	19.4	6.92	B D N	mg/Kg	☼	36	75 - 125
Lithium	6.8	B D	9.70	17.66	D	mg/Kg	☼	112	75 - 125

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.1	U D N	20.4	7.93	B D N	mg/Kg	☼	39	75 - 125	14	30
Lithium	6.8	B D	10.2	18.41	D	mg/Kg	☼	114	75 - 125	4	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	**Client Sample ID**	**DCB2 (72-115)**	**TCX2 (71-111)**
LCS 160-402188/2-A	Lab Control Sample	104	99
MB 160-402188/1-A	Method Blank	105	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**
160-31887-5	B3KL78	85
160-31887-6	B3KL82	85
160-31887-6 MS	B3KL82	82
160-31887-6 MSD	B3KL82	87
160-31887-7	B3KL83	83
160-31887-15	B3KL81	83
160-31887-16	B3KL77	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**
LCS 160-402292/2-A	Lab Control Sample	90
MB 160-402292/1-A	Method Blank	94

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 10 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL464275, GEL464511, GEL464549

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL464275, GEL464511 and GEL464549 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3KL43	11/12/18	Soil	C	8151A
B3KL44	11/12/18	Soil	C	8151A
B3KL57	11/12/18	Soil	C	8151A
B3KL58	11/12/18	Soil	C	8151A
B3KL62	11/12/18	Soil	C	8151A
B3KL45	11/13/18	Soil	C	8151A
B3KL48	11/13/18	Soil	C	8151A
B3KL49	11/13/18	Soil	C	8151A
B3KL50	11/13/18	Soil	C	8151A
B3KL51	11/13/18	Soil	C	8151A
B3KL52	11/13/18	Soil	C	8151A
B3KL53	11/13/18	Soil	C	8151A
B3KL54	11/13/18	Soil	C	8151A
B3KL63	11/13/18	Soil	C	8151A
B3KL55	11/14/18	Soil	C	8151A
B3KL56	11/14/18	Soil	C	8151A
B3KL59	11/14/18	Soil	C	8151A
B3KL60	11/14/18	Soil	C	8151A
B3KL61	11/14/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL464275, the 2,4-dichlorophenylacetic acid on the primary column for samples B3KL43, B3KL43MS, B3KL43MSD and both columns for sample B3KL62 were above the upper acceptance limit. All results for samples B3KL43 and B3KL62 were non-detects and should not be qualified as a result. Since samples B3KL43MS and B3KL43MSD were QC samples data should not be qualified.

For SDG GEL464549, the 2,4-dichlorophenylacetic acid recoveries on both columns for samples B3KL55MS and B3KL55MSD were below the lower acceptance limit but ≥10%. Since these samples were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG GEL464275, the MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." The MS and MSD recoveries for dalapon and MCPA were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples. The MS and/or MSD recoveries for 2,4-D, 2,4-DB, dichlorprop and MCPP were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

For SDG GEL464511, the MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as useable and flagged "UR." The MS and/or MSD recoveries for 2,4,5-TP, 2,4-DB and dalapon were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples. The MS and/or MSD recoveries for 2,4-D, diclorprop and MCPP were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

For SDG GEL464549, the MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of all affected samples. The MS and/or MSD recoveries for 2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dicamba, dichlorprop, MCPA and MCPP were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG GEL464275, the LCS recoveries for dalapon and dinoseb were below the lower acceptance limit. All associated sample results were non-detects; therefore based on professional judgment all dalapon results should be qualified as estimates and flagged "UJ." All associated dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected samples.

For SDG GEL464511, the LCS recovery for dinoseb was below the lower acceptance limit. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to the very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected samples.

For SDG GEL464549, the LCS recovery for dinoseb was below the lower acceptance limit. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable with the following exception.

For SDG GEL464511, the MS/MSD RPD for 2,4-DB, dichloroprop and MCPP were above the acceptance limit. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL464275, GEL464511 and GEL464549 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 90%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of sample results were due to very low matrix spike and low LCS recoveries. See the table in Appendix 2 for a listing of all affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of the sample results were due to low matrix spike and poor MS/MSD precision. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Herbicide Data Qualification Summary			
SDGs: GEL464275, GEL464511, GEL464549	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Dinoseb	UR	B3KL43, B3KL44, B3KL57, B3KL58, B3KL62, B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63, B3KL55, B3KL56, B3KL59, B3KL60, B3KL61	Very low matrix spike recoveries and low LCS recoveries.
Dalapon	UJ	B3KL43, B3KL44, B3KL57, B3KL58, B3KL62	Low matrix spike recoveries and low LCS recovery.
MCPA	UJ	B3KL43, B3KL44, B3KL57, B3KL58, B3KL62	Low matrix spike recoveries
Dalapon	UJ	B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63	Low matrix spike recoveries
2,4,5-TP	UJ	B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63	Low matrix spike recoveries
2,4-DB	UJ	B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63	Low matrix spike recoveries and poor MS/MSD precision
Dichlorprop, MCPP	UJ	B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63	Poor MS/MSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/08/19	
			SDG: GEL464275, GEL464511, GEL464549		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX: Soil					
GEL464275: B3KL43, B3KL44, B3KL57, B3KL58, B3KL62					
GEL464511: B3KL45, B3KL48, B3KL49, B3KL50, B3KL51, B3KL52, B3KL53, B3KL54, B3KL63					
GEL464549: B3KL55, B3KL56, B3KL59, B3KL60, B3KL61					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	(Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes (No) N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	Yes (No) N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

Surrogate

GEL464275: DCAA1: B3KL43 223%, B3KL43MS 653%, B3KL43MSD 654%; B3KL62 170%/DCAA 2 164%

GEL464549: DCAA1/DCAA2: B3KL55MS 39%/41%; B3KL55MSD 43%/42%

MS/MSD

GEL464275: 2,4-D 202%/194%: 2,4-DB 318%/334%; Dalapon 65%/65%: Dichlorprop 156%/147%; dinoseb 0%/0%; MCPA 56%/48%: MCPP 141% (MS)

GEL464511: 2,4,5-TP 66% (MS): 2,4-D 139% (MSD), 2,4-DB (MS) 60%; Dalapon 59%/57%; Dinoseb 0%/0% Dicloroprop 137% (MSD), MCPP 168% (MSD)

GEL464549: 2,4,5-T 163%/169%; 2,4,5-TP 141%/147%; 2,4-D 179%/190%; 2,4-DB 135%/156%, Dicamba 144%/150%; Dichlorprop 133%/142%; Dinoseb 0%/0%; MCPA 133%/156%; MCPP 139%(MSD)

LCS

GEL464275: Dalapon 63%; Dinoseb 68%
GEL464511: Dinoseb 54%
GEL464549: Dinoseb 54%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL464511: 2,4-DB 55%; Dichlorprop 44%; MCPP 48%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL464275

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204160446	MB for batch 1822866	109	104
1204160447	LCS for batch 1822866	111	98
464275001	B3KL43	223 *	72
1204160448	B3KL43MS	653 *	99
1204160449	B3KL43MSD	654 *	104
464275003	B3KL44	76	78
464275005	B3KL57	73	73
464275007	B3KL58	87	79
464275009	B3KL62	170 *	164 *

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 19, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464275**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1822867										
QC1204160447 LCS										
2,4,5-T	40.0			41.9	ug/kg		105	(60%-139%)	LOF	11/16/18 18:52
2,4,5-TP	40.0			38.1	ug/kg		95	(62%-140%)		
2,4-D	40.0			39.2	ug/kg		98	(55%-140%)		
2,4-DB	40.0			35.2	ug/kg		88	(51%-152%)		
Dalapon	400			250	ug/kg		63	(32%-110%)		
Dicamba	40.0			34.9	ug/kg		87	(53%-135%)		
Dichlorprop	40.0			36.9	ug/kg		92	(52%-136%)		
Dinoseb	40.0			27.2	ug/kg		68	(24%-104%)		
MCPA	4000			3360	ug/kg		84	(44%-142%)		
MCPP	4000			3460	ug/kg		87	(39%-138%)		
**2,4-Dichlorophenylacetic acid	100			97.6	ug/kg		98	(37%-149%)		
QC1204160446 MB										
2,4,5-T			U	1.66	ug/kg					11/16/18 18:24
2,4,5-TP			U	1.66	ug/kg					

QC Summary

Workorder: **464275**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1822867											
2,4-D				U	1.66	ug/kg				LOF	11/16/18 18:24
2,4-DB				U	1.66	ug/kg					
Dalapon				U	35.0	ug/kg					
Dicamba				U	2.00	ug/kg					
Dichlorprop				U	2.26	ug/kg					
Dinoseb				U	1.66	ug/kg					
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	100				104	ug/kg		104	(37%-149%)		
QC1204160448 464275001 MS											
2,4,5-T	41.6	U	1.73		34.3	ug/kg		82	(39%-144%)		11/16/18 19:48
2,4,5-TP	41.6	U	1.73		32.1	ug/kg		77	(40%-146%)		
2,4-D	41.6	TU	1.73	EPT	84.0	ug/kg		202*	(40%-149%)		
2,4-DB	41.6	TU	1.73	EPT	132	ug/kg		318*	(29%-160%)		
Dalapon	416	U	36.4		272	ug/kg		65	(19%-132%)		
Dicamba	41.6	U	2.08	P	35.8	ug/kg		86	(46%-135%)		

QC Summary

Workorder: **464275**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1822867											
Dichlorprop	41.6	TU	2.35	PT	64.8	ug/kg		156*	(38%-145%)	LOF	11/16/18 19:48
Dinoseb	41.6	TU	1.73	TU	1.73	ug/kg		0*	(20%-118%)		
MCPA	4160	U	239	P	2330	ug/kg		56	(29%-154%)		
MCPP	4160	TU	208	PT	5850	ug/kg		141*	(30%-135%)		
**2,4-Dichlorophenylacetic acid	208		75.3		207	ug/kg		99	(37%-149%)		
QC1204160449 464275001 MSD											
2,4,5-T	41.6	U	1.73		34.9	ug/kg	2	84	(0%-30%)		11/16/18 20:17
2,4,5-TP	41.6	U	1.73		32.1	ug/kg	0	77	(0%-30%)		
2,4-D	41.6	TU	1.73	PT	80.6	ug/kg	4	194*	(0%-30%)		
2,4-DB	41.6	TU	1.73	EPT	139	ug/kg	5	334*	(0%-30%)		
Dalapon	416	U	36.4		271	ug/kg	1	65	(0%-30%)		
Dicamba	41.6	U	2.08	P	35.0	ug/kg	2	84	(0%-30%)		
Dichlorprop	41.6	TU	2.35	PT	60.9	ug/kg	6	147*	(0%-30%)		
Dinoseb	41.6	TU	1.73	TU	1.73	ug/kg	N/A	0*	(0%-30%)		
MCPA	4160	U	239	P	1990	ug/kg	16	48	(0%-30%)		
MCPP	4160	TU	208	P	5050	ug/kg	15	122	(0%-30%)		

QC Summary

Workorder: **464275**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1822867											
**2,4-Dichlorophenylacetic acid	208	75.3		217	ug/kg		104	(37%-149%)	LOF	11/16/18	20:17

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL464511

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204161744	MB for batch 1823443	123	107
1204161745	LCS for batch 1823443	122	112
464511001	B3KL45	112	102
1204161746	B3KL45MS	85	95
1204161747	B3KL45MSD	110	104
464511002	B3KL48	101	114
464511003	B3KL49	106	100
464511004	B3KL50	102	97
464511005	B3KL51	80	84
464511006	B3KL52	80	88
464511007	B3KL53	95	97
464511008	B3KL54	75	87
464511009	B3KL63	87	90

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 26, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464511**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1823444										
QC1204161745 LCS										
2,4,5-T	40.0			51.2	ug/kg		128	(60%-139%)	LOF	11/21/18 08:10
2,4,5-TP	40.0			43.0	ug/kg		107	(62%-140%)		
2,4-D	40.0			45.4	ug/kg		113	(55%-140%)		
2,4-DB	40.0			45.5	ug/kg		114	(51%-152%)		
Dalapon	400			321	ug/kg		80	(32%-110%)		
Dicamba	40.0			43.2	ug/kg		108	(53%-135%)		
Dichlorprop	40.0			39.5	ug/kg		99	(52%-136%)		
Dinoseb	40.0			21.4	ug/kg		54	(24%-104%)		
MCPA	4000			3510	ug/kg		88	(44%-142%)		
MCPP	4000			3700	ug/kg		92	(39%-138%)		
**2,4-Dichlorophenylacetic acid	100			112	ug/kg		112	(37%-149%)		
QC1204161744 MB										
2,4,5-T			U	1.66	ug/kg					11/21/18 07:51
2,4,5-TP			U	1.66	ug/kg					

QC Summary

Workorder: **464511**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1823444											
2,4-D				U	1.66	ug/kg				LOF	11/21/18 07:51
2,4-DB				U	1.66	ug/kg					
Dalapon				U	35.0	ug/kg					
Dicamba				U	2.00	ug/kg					
Dichlorprop				U	2.26	ug/kg					
Dinoseb				U	1.66	ug/kg					
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	100				107	ug/kg		107	(37%-149%)		
QC1204161746 464511001 MS											
2,4,5-T	41.2	U	1.71		30.9	ug/kg		75	(39%-144%)		11/21/18 08:58
2,4,5-TP	41.2	U	1.71		27.4	ug/kg		66	(40%-146%)		
2,4-D	41.2	U	1.71	P	45.4	ug/kg		110	(40%-149%)		
2,4-DB	41.2	U	1.71	P	24.7	ug/kg		60	(29%-160%)		
Dalapon	412	U	36.1		244	ug/kg		59	(19%-132%)		
Dicamba	41.2	U	2.06		32.0	ug/kg		78	(46%-135%)		

QC Summary

Workorder: **464511**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1823444											
Dichlorprop	41.2	U	2.33		35.7	ug/kg		87	(38%-145%)	LOF	11/21/18 08:58
Dinoseb	41.2	TU	1.71	TU	1.71	ug/kg		0*	(20%-118%)		
MCPA	4120	U	237		4410	ug/kg		107	(29%-154%)		
MCPP	4120	TU	206	P	4250	ug/kg		103	(30%-135%)		
**2,4-Dichlorophenylacetic acid	103		105		98.5	ug/kg		95	(37%-149%)		
QC1204161747 464511001 MSD											
2,4,5-T	41.1	U	1.71		32.6	ug/kg	5	79	(0%-30%)		11/21/18 09:26
2,4,5-TP	41.1	U	1.71		32.7	ug/kg	18	80	(0%-30%)		
2,4-D	41.1	U	1.71		57.2	ug/kg	23	139	(0%-30%)		
2,4-DB	41.1	U	1.71	P	43.4	ug/kg	55*	106	(0%-30%)		
Dalapon	411	U	36.1		236	ug/kg	4	57	(0%-30%)		
Dicamba	41.1	U	2.06		31.8	ug/kg	1	77	(0%-30%)		
Dichlorprop	41.1	U	2.33		56.2	ug/kg	44*	137	(0%-30%)		
Dinoseb	41.1	TU	1.71	TU	1.71	ug/kg	N/A	0*	(0%-30%)		
MCPA	4110	U	237		5210	ug/kg	17	127	(0%-30%)		
MCPP	4110	TU	206	T	6910	ug/kg	48*	168*	(0%-30%)		

QC Summary

Workorder: **464511**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1823444											
**2,4-Dichlorophenylacetic acid	103	105		107	ug/kg		104	(37%-149%)	LOF	11/21/18	09:26

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL464549

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204161744	MB for batch 1823443	123	107
1204161745	LCS for batch 1823443	122	112
464549001	B3KL55	89	96
1204161748	B3KL55MS	39	41
1204161749	B3KL55MSD	43	42
464549003	B3KL56	82	94
464549005	B3KL59	102	108
464549007	B3KL60	102	110
464549009	B3KL61	100	106

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 26, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464549**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1823444											
QC1204161745 LCS											
2,4,5-T	40.0			51.2	ug/kg		128	(60%-139%)	LOF	11/21/18	08:10
2,4,5-TP	40.0			43.0	ug/kg		107	(62%-140%)			
2,4-D	40.0			45.4	ug/kg		113	(55%-140%)			
2,4-DB	40.0			45.5	ug/kg		114	(51%-152%)			
Dalapon	400			321	ug/kg		80	(32%-110%)			
Dicamba	40.0			43.2	ug/kg		108	(53%-135%)			
Dichlorprop	40.0			39.5	ug/kg		99	(52%-136%)			
Dinoseb	40.0			21.4	ug/kg		54	(24%-104%)			
MCPA	4000			3510	ug/kg		88	(44%-142%)			
MCPP	4000			3700	ug/kg		92	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			112	ug/kg		112	(37%-149%)			
QC1204161744 MB											
2,4,5-T			U	1.66	ug/kg					11/21/18	07:51
2,4,5-TP			U	1.66	ug/kg						

QC Summary

Workorder: **464549**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1823444											
2,4-D				U	1.66	ug/kg				LOF	11/21/18 07:51
2,4-DB				U	1.66	ug/kg					
Dalapon				U	35.0	ug/kg					
Dicamba				U	2.00	ug/kg					
Dichlorprop				U	2.26	ug/kg					
Dinoseb				U	1.66	ug/kg					
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	100				107	ug/kg		107	(37%-149%)		
QC1204161748 464549001 MS											
2,4,5-T	48.1	TU	2.00	T	78.3	ug/kg		163*	(39%-144%)		11/21/18 14:39
2,4,5-TP	48.1	TU	2.00		68.0	ug/kg		141	(40%-146%)		
2,4-D	48.1	TU	2.00	T	86.1	ug/kg		179*	(40%-149%)		
2,4-DB	48.1	U	2.00		65.0	ug/kg		135	(29%-160%)		
Dalapon	481	U	42.1		419	ug/kg		87	(19%-132%)		
Dicamba	48.1	TU	2.41	T	69.4	ug/kg		144*	(46%-135%)		

QC Summary

Workorder: **464549**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1823444											
Dichlorprop	48.1	U	2.72		64.2	ug/kg		133	(38%-145%)	LOF	11/21/18 14:39
Dinoseb	48.1	TU	2.00	TU	2.00	ug/kg		0*	(20%-118%)		
MCPA	4810	TU	277		6390	ug/kg		133	(29%-154%)		
MCPP	4810	TU	241		5360	ug/kg		111	(30%-135%)		
**2,4-Dichlorophenylacetic acid	240		107		93.3	ug/kg		39	(37%-149%)		
QC1204161749 464549001 MSD											
2,4,5-T	48.1	TU	2.00	T	81.1	ug/kg	3	169*	(0%-30%)		11/21/18 15:07
2,4,5-TP	48.1	TU	2.00	T	70.4	ug/kg	3	147*	(0%-30%)		
2,4-D	48.1	TU	2.00	T	91.4	ug/kg	6	190*	(0%-30%)		
2,4-DB	48.1	U	2.00		74.7	ug/kg	14	156	(0%-30%)		
Dalapon	481	U	42.1		432	ug/kg	3	90	(0%-30%)		
Dicamba	48.1	TU	2.41	T	72.1	ug/kg	4	150*	(0%-30%)		
Dichlorprop	48.1	U	2.72		68.5	ug/kg	7	142	(0%-30%)		
Dinoseb	48.1	TU	2.00	TU	1.99	ug/kg	N/A	0*	(0%-30%)		
MCPA	4810	TU	277	T	7470	ug/kg	16	156*	(0%-30%)		
MCPP	4810	TU	241	T	6670	ug/kg	22	139*	(0%-30%)		

QC Summary

Workorder: **464549**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1823444											
**2,4-Dichlorophenylacetic acid	240	107		102	ug/kg		43	(37%-149%)	LOF	11/21/18	15:07

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 08 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Inorganics - Sample Data Groups (SDGs) SL31839-1, SL31884-1, SL31887-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31839-1, SL31884-1 and SL31887-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KL65	11/12/18	Soil	C	6010D, 6020B, 7471B
B3KL66	11/12/18	Soil	C	6010D, 6020B, 7471B
B3KL79	11/12/18	Soil	C	6010D, 6020B, 7471B
B3KL80	11/12/18	Soil	C	6010D, 6020B, 7471B
B3KL84	11/12/18	Soil	C	6010D, 6020B, 7471B
B3KL67	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL70	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL71	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL72	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL73	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL74	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL75	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL76	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL85	11/13/18	Soil	C	6010D, 6020B, 7471B
B3KL78	11/14/18	Soil	C	6010D, 6020B, 7471B
B3KL82	11/14/18	Soil	C	6010D, 6020B, 7471B
B3KL83	11/14/18	Soil	C	6010D, 6020B, 7471B
B3KL81	11/14/18	Soil	C	6010D, 6020B, 7471B
B3KL77	11/14/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG SL31839-1, the Ni laboratory blank result was a detect > the method detection limit (MDL) but < the reporting limit (RL). All associated sample results were detects ≥20X the blank value and should not be qualified.

For SDG SL31884-1, the Ni and Sn laboratory blank results were > the MDLs but < the RLs. All associated Ni sample results were detects ≥20X the blank value and should not be qualified. All associated Sn sample results were detects > the RL but <20X the blank value and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL31887-1, the Ni and Sn laboratory blank results were > the MDLs but < the RLs. All associated Ni sample results were detects ≥20X the blank value and should not be qualified. All associated Sn sample results were detects > the RL but <20X the blank value and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected samples.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample and ICP-AES interference check sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31839-1, the MS and MSD recoveries for B were < the lower acceptance limit but ≥30% and a PDS sample was not analyzed. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." The MS and MSD recoveries for Al and Mn were > the upper acceptance limit. All associated Mn sample results were detects and should be qualified as estimates and flagged "J+. See the table in Appendix 2 for a listing of affected samples. The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified.

For SDG SL31884-1, the MS and MSD recoveries for B were <30% and a PDS sample was not analyzed. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." The MS and MSD recoveries for Al and Mn were above the acceptance limit. All associated sample results were detect; therefore all Mn sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected samples. The parent sample result for Al was >4X the spike concentration; therefore, data should not be qualified as a result.

For SDG SL31887-1, the MS and MSD recoveries for B were < the lower acceptance limit but ≥30% and a PDS sample was not analyzed. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples. The MS and MSD recoveries for Al were > the upper acceptance limit; however the parent sample result was >4X the spike concentration; therefore data should not be qualified.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the

laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable with the following exceptions.

The RPDs for samples B3KL79 and B3KL84 were Cr 49% and Sr 38%.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The MDLs for As, Be Cd, Cr, Pb, Zn and Hg met required CRDLs. No other target analyte CRDLs were provided.

- **Completeness**

SDGs SL31839-1, SL31884-1 and SL31887-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 97%.

MAJOR DEFICIENCIES

Major deficiency leading to qualification of the B sample results as unusable was due to very low matrix spike recoveries.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to a laboratory blank infraction for Sn, and matrix spike infractions for B and Mn. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Metals Data Qualification Summary			
SDGs: SL31839-1, SL31884-1, SL31887-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Sn	J+	B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85, B3KL78, B3KL82, B3KL83, B3KL81, B3KL77,	Laboratory blank contamination
B	UJ	B3KL65, B3KL66, B3KL79, B3KL80, B3KL84, B3KL78, B3KL82, B3KL83, B3KL81, B3KL77	Low matrix spike recoveries.
Mn	J+	B3KL65, B3KL66, B3KL79, B3KL80, B3KL84, B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85	High matrix spike recoveries
B	UR	B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85	Very low matrix spike recoveries.

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-011		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/08/19	
			SDG: SL31839-1, SL31884-1, SL31887-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SDG SL31839-1: B3KL65, B3KL66, B3KL79, B3KL80, B3KL84					
SDG SL31884-1: B3KL67, B3KL70, B3KL71, B3KL72, B3KL73, B3KL74, B3KL75, B3KL76, B3KL85					
SDG SL31887-1: B3KL78, B3KL82, B3KL83, B3KL81, B3KL77					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG SL31839-1: Ni 0.293 mg/kg
SDG SL31884-1: Ni 0.308 mg/kg, Sn 0.107 mg/kg
SDG SL31887-1: Ni 0.308 mg/kg, Sn 0.107 mg/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL31839-1: B 47%/41%; Al 343%/303%; Mn 190%/131% (Al parent sample >4X spike)

SDG SL31884-1: B 27%/28%; Al 268%/245%; Mn 148%/147% (Al parent sample >4X spike)

SDG SL31887-1: B 36%/39%; Al 239%/252% (Al parent sample >4X spike)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG SL31839-1: B3KL79/B3KL84 Cr 49%, Sr 38%

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No (N/A)
ICP serial dilution %D values acceptable?	Yes No (N/A)
ICP post digestion spike required?	Yes No (N/A)
ICP post digestion spike values acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were provided.

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-401052/2-A
Matrix: Solid
Analysis Batch: 401719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401052

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	83		23 - 146

Lab Sample ID: 160-31839-3 MS
Matrix: Soil
Analysis Batch: 401719

Client Sample ID: B3KL79
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	173		ug/Kg	☼	97	23 - 140
Aroclor 1260	11	U	178	183		ug/Kg	☼	103	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	102		23 - 146

Lab Sample ID: 160-31839-3 MSD
Matrix: Soil
Analysis Batch: 401719

Client Sample ID: B3KL79
Prep Type: Total/NA
Prep Batch: 401052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	176	164		ug/Kg	☼	93	23 - 140	5	30
Aroclor 1260	11	U	176	173		ug/Kg	☼	98	20 - 131	6	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401270/1-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401270

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/16/18 11:12	11/20/18 03:07	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/16/18 11:12	11/20/18 03:07	1

Lab Sample ID: LCS 160-401270/2-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401270

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.53	9.60		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-401270/3-A
Matrix: Solid
Analysis Batch: 401804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401270

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	78.46	D	mg/Kg		85.7	53.5 - 124.5

Lab Sample ID: 160-31839-1 MS — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 401804 — **Prep Batch: 401270**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U D N	20.0	9.40	B D N	mg/Kg	☼	47	75 - 125
Lithium	7.7	B D N	10.0	20.46	D N	mg/Kg	☼	127	75 - 125

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 401804 — **Prep Batch: 401270**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U D N	18.0	7.28	B D N	mg/Kg	☼	41	75 - 125	25	30
Lithium	7.7	B D N	8.99	18.70	D	mg/Kg	☼	122	75 - 125	9	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-401269/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401269**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		11/16/18 11:10	11/22/18 05:32	2

Lab Sample ID: LCS 160-401269/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401269**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	46.0	43.95	D	mg/Kg		96	21 - 251

Lab Sample ID: 160-31839-1 MS — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401269**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.25	B D	45.7	42.98	D	mg/Kg	☼	93	75 - 125

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401269**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.25	B D	49.1	47.17	D	mg/Kg	☼	95	75 - 125	9	30

Lab Sample ID: MB 160-401271/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401271**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.9	U D	4.7	1.9	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Arsenic	0.38	U D	0.94	0.38	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Barium	0.47	U D	1.9	0.47	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Beryllium	0.038	U D	0.094	0.038	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Cadmium	0.023	U D	0.047	0.023	mg/Kg		11/16/18 11:14	11/21/18 23:40	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-401271/1-A
Matrix: Solid
Analysis Batch: 402411

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401271

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.42	U D	0.94	0.42	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Cobalt	0.070	U D	0.19	0.070	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Copper	0.38	U D	0.94	0.38	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Lead	0.12	U D	0.28	0.12	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Manganese	0.19	U D	0.47	0.19	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Molybdenum	0.19	U D	0.47	0.19	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Nickel	0.293	B D	0.47	0.19	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Silver	0.070	U D	0.19	0.070	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Strontium	0.23	U D	0.47	0.23	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Uranium	0.038	U D	0.094	0.038	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Vanadium	0.38	U D	0.94	0.38	mg/Kg		11/16/18 11:14	11/21/18 23:40	2
Zinc	1.9	U D	4.7	1.9	mg/Kg		11/16/18 11:14	11/21/18 23:40	2

Lab Sample ID: MB 160-401271/1-A
Matrix: Solid
Analysis Batch: 403072

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401271

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	0.30	U D	0.47	0.30	mg/Kg		11/16/18 11:14	11/27/18 20:57	2

Lab Sample ID: LCS 160-401271/2-A
Matrix: Solid
Analysis Batch: 402411

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401271

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	85.3	89.04	D	mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-401271/3-A
Matrix: Solid
Analysis Batch: 402411

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401271

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7519	D	mg/Kg		89.9	50.2 - 149.5
Arsenic	161	180.6	D	mg/Kg		112.2	70.2 - 129.8
Barium	260	290.0	D	mg/Kg		111.5	75.0 - 125.0
Beryllium	97.6	109.4	D	mg/Kg		112.1	75.0 - 125.0
Cadmium	211	233.9	D	mg/Kg		110.9	74.9 - 125.1
Chromium	136	141.4	D	mg/Kg		104.0	70.0 - 130.1
Cobalt	48.2	54.25	D	mg/Kg		112.6	74.9 - 124.9
Copper	166	189.2	D	mg/Kg		113.9	74.7 - 124.7
Lead	111	122.4	D	mg/Kg		110.3	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-401271/3-A
Matrix: Solid
Analysis Batch: 402411

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401271

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	261.1	D	mg/Kg		90.7	57.3 - 101.0
Molybdenum	110	126.4	D	mg/Kg		114.9	70.5 - 129.1
Nickel	91.9	105.2	D	mg/Kg		114.4	70.0 - 129.5
Silver	43.3	48.42	D	mg/Kg		111.8	69.5 - 130.5
Strontium	107	123.7	D	mg/Kg		115.6	72.1 - 128.0
Vanadium	56.7	56.79	D	mg/Kg		100.2	56.8 - 143.4
Zinc	199	228.9	D	mg/Kg		115.0	69.8 - 130.2

Lab Sample ID: LCSSRM 160-401271/3-A
Matrix: Solid
Analysis Batch: 403072

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401271

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	191	231.2	D	mg/Kg		121.0	68.6 - 131.9

Lab Sample ID: 160-31839-1 MS
Matrix: Soil
Analysis Batch: 402411

Client Sample ID: B3KL65
Prep Type: Total/NA
Prep Batch: 401271

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6410	D	1000	9846	D X	mg/Kg	☼	343	75 - 125
Arsenic	3.3	D	100	111.2	D	mg/Kg	☼	108	75 - 125
Barium	86.8	D	100	197.2	D	mg/Kg	☼	110	75 - 125
Beryllium	0.30	D	10.0	10.86	D	mg/Kg	☼	106	75 - 125
Cadmium	0.12	D	100	104.4	D	mg/Kg	☼	104	75 - 125
Chromium	9.4	D	100	109.1	D	mg/Kg	☼	100	75 - 125
Cobalt	8.8	D	100	118.1	D	mg/Kg	☼	109	75 - 125
Copper	13.3	D	100	122.6	D	mg/Kg	☼	109	75 - 125
Lead	6.5	D	100	109.7	D	mg/Kg	☼	103	75 - 125
Manganese	362	D N	100	551.9	D N	mg/Kg	☼	190	75 - 125
Molybdenum	0.50	B D	50.0	52.27	D	mg/Kg	☼	104	75 - 125
Nickel	12.2	D C	100	121.6	D	mg/Kg	☼	109	75 - 125
Silver	0.19	U D	20.0	20.95	D	mg/Kg	☼	105	75 - 125
Strontium	23.1	D	100	132.7	D	mg/Kg	☼	110	75 - 125
Uranium	0.54	D	100	103.7	D	mg/Kg	☼	103	75 - 125
Vanadium	54.9	D	100	158.6	D	mg/Kg	☼	104	75 - 125
Zinc	50.5	D	100	161.5	D	mg/Kg	☼	111	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31839-1 MS — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403072 — **Prep Batch: 401271**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	1.4	D	50.0	54.85	D	mg/Kg	☼	107	75 - 125

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402411 — **Prep Batch: 401271**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6410	D	899	9136	D X	mg/Kg	☼	303	75 - 125	7	30
Arsenic	3.3	D	89.9	95.97	D	mg/Kg	☼	103	75 - 125	15	30
Barium	86.8	D	89.9	185.3	D	mg/Kg	☼	109	75 - 125	6	30
Beryllium	0.30	D	8.99	9.79	D	mg/Kg	☼	106	75 - 125	10	30
Cadmium	0.12	D	89.9	92.98	D	mg/Kg	☼	103	75 - 125	12	30
Chromium	9.4	D	89.9	93.54	D	mg/Kg	☼	94	75 - 125	15	30
Cobalt	8.8	D	89.9	104.1	D	mg/Kg	☼	106	75 - 125	13	30
Copper	13.3	D	89.9	109.2	D	mg/Kg	☼	107	75 - 125	12	30
Lead	6.5	D	89.9	99.00	D	mg/Kg	☼	103	75 - 125	10	30
Manganese	362	D N	89.9	479.7	D X	mg/Kg	☼	131	75 - 125	14	30
Molybdenum	0.50	B D	44.9	47.08	D	mg/Kg	☼	104	75 - 125	10	30
Nickel	12.2	D C	89.9	107.5	D	mg/Kg	☼	106	75 - 125	12	30
Silver	0.19	U D	18.0	18.76	D	mg/Kg	☼	104	75 - 125	11	30
Strontium	23.1	D	89.9	126.0	D	mg/Kg	☼	114	75 - 125	5	30
Uranium	0.54	D	89.9	92.63	D	mg/Kg	☼	102	75 - 125	11	30
Vanadium	54.9	D	89.9	143.1	D	mg/Kg	☼	98	75 - 125	10	30
Zinc	50.5	D	89.9	147.0	D	mg/Kg	☼	107	75 - 125	9	30

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403072 — **Prep Batch: 401271**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	1.4	D	44.9	47.36	D	mg/Kg	☼	102	75 - 125	15	30

Lab Sample ID: MB 160-403081/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404150 — **Prep Batch: 403081**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.086	U D	0.19	0.086	mg/Kg		11/28/18 10:30	12/04/18 15:18	2

Lab Sample ID: LCSSRM 160-403081/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404150 — **Prep Batch: 403081**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	105.8	D	mg/Kg		105.9	56.8 - 143.1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31839-1 MS — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404150 — **Prep Batch: 403081**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	0.44	D	97.4	106.4	D	mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404150 — **Prep Batch: 403081**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tin	0.44	D	97.8	102.0	D	mg/Kg	☼	104	75 - 125	4	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402412/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402412**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		11/26/18 09:14	11/26/18 16:45	1

Lab Sample ID: LCSSRM 160-402412/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402412**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.90	2.53	D	mg/Kg		87.2	50.7 - 149.3

Lab Sample ID: 160-31839-1 MS — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402412**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.012	U	0.927	0.905		mg/Kg	☼	98	80 - 120

Lab Sample ID: 160-31839-1 MSD — **Client Sample ID: B3KL65**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402412**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.012	U	1.00	0.981		mg/Kg	☼	98	80 - 120	8	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31884-7 MSD — **Client Sample ID: B3KL75**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	171	139		ug/Kg	☼	81	23 - 140	1	30
Aroclor 1260	10	U	171	145		ug/Kg	☼	85	20 - 131	15	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401976/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/20/18 19:46	11/30/18 15:54	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/20/18 19:46	11/30/18 15:54	1

Lab Sample ID: LCS 160-401976/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.89	9.31		mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-401976/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	73.20	D	mg/Kg		79.9	53.5 - 124.5

Lab Sample ID: 160-31884-1 MS — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U D N	18.9	5.09	B D N	mg/Kg	☼	27	75 - 125
Lithium	6.7	B D	9.46	16.97	D	mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-31884-1 MSD — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U D N	19.6	5.49	B D N	mg/Kg	☼	28	75 - 125	8	30
Lithium	6.7	B D	9.81	16.94	D	mg/Kg	☼	105	75 - 125	0	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-401975/1-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401975

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.9	U D	4.7	1.9	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Arsenic	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Barium	0.47	U D	1.9	0.47	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Beryllium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Cadmium	0.022	U D	0.047	0.022	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Chromium	0.42	U D	0.94	0.42	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Cobalt	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Copper	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Lead	0.12	U D	0.28	0.12	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Manganese	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Molybdenum	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Nickel	0.308	B D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Selenium	0.30	U D	0.47	0.30	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Silver	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Strontium	0.22	U D	0.47	0.22	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Tin	0.107	B D	0.19	0.084	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Uranium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Vanadium	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Zinc	1.9	U D	4.7	1.9	mg/Kg		11/20/18 19:44	11/30/18 17:27	2

Lab Sample ID: LCS 160-401975/2-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	88.9	95.73	D	mg/Kg		108	80 - 120

Lab Sample ID: LCSSRM 160-401975/3-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7586	D	mg/Kg		90.7	50.2 - 149.5
Arsenic	161	175.6	D	mg/Kg		109.1	70.2 - 129.8
Barium	260	276.2	D	mg/Kg		106.2	75.0 - 125.0
Beryllium	97.6	105.6	D	mg/Kg		108.2	75.0 - 125.0
Cadmium	211	222.5	D	mg/Kg		105.4	74.9 - 125.1
Chromium	136	145.0	D	mg/Kg		106.6	70.0 - 130.1
Cobalt	48.2	53.53	D	mg/Kg		111.1	74.9 - 124.9
Copper	166	185.7	D	mg/Kg		111.9	74.7 - 124.7
Lead	111	116.6	D	mg/Kg		105.0	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-401975/3-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	239.1	D	mg/Kg		83.0	57.3 - 101.0
Molybdenum	110	119.6	D	mg/Kg		108.7	70.5 - 129.1
Nickel	91.9	103.7	D	mg/Kg		112.9	70.0 - 129.5
Selenium	191	216.8	D	mg/Kg		113.5	68.6 - 131.9
Silver	43.3	45.13	D	mg/Kg		104.2	69.5 - 130.5
Strontium	107	116.2	D	mg/Kg		108.6	72.1 - 128.0
Tin	99.9	103.5	D	mg/Kg		103.6	56.8 - 143.1
Vanadium	56.7	58.64	D	mg/Kg		103.4	56.8 - 143.4
Zinc	199	218.8	D	mg/Kg		109.9	69.8 - 130.2

Lab Sample ID: 160-31884-1 MS
Matrix: Soil
Analysis Batch: 403828

Client Sample ID: B3KL67
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6060	D	946	8603	D X	mg/Kg	☼	268	75 - 125
Arsenic	2.9	D	94.6	99.10	D	mg/Kg	☼	102	75 - 125
Barium	82.7	D	94.6	182.2	D	mg/Kg	☼	105	75 - 125
Beryllium	0.32	D	9.46	10.40	D	mg/Kg	☼	106	75 - 125
Cadmium	0.12	D	94.6	96.52	D	mg/Kg	☼	102	75 - 125
Chromium	8.1	D	94.6	94.47	D	mg/Kg	☼	91	75 - 125
Cobalt	10.2	D	94.6	105.6	D	mg/Kg	☼	101	75 - 125
Copper	16.3	D	94.6	113.0	D	mg/Kg	☼	102	75 - 125
Lead	7.0	D	94.6	103.0	D	mg/Kg	☼	101	75 - 125
Manganese	364	D N	94.6	504.1	D N	mg/Kg	☼	148	75 - 125
Molybdenum	0.41	B D	47.3	48.67	D	mg/Kg	☼	102	75 - 125
Nickel	14.6	D	94.6	107.0	D	mg/Kg	☼	98	75 - 125
Selenium	2.2	D	47.3	48.92	D	mg/Kg	☼	99	75 - 125
Silver	0.073	U D	18.9	19.18	D	mg/Kg	☼	101	75 - 125
Strontium	23.6	D	94.6	125.5	D	mg/Kg	☼	108	75 - 125
Tin	0.54	D C	94.6	95.69	D	mg/Kg	☼	101	75 - 125
Uranium	0.47	D	94.6	101.1	D	mg/Kg	☼	106	75 - 125
Vanadium	66.7	D	94.6	159.2	D	mg/Kg	☼	98	75 - 125
Zinc	64.8	D	94.6	160.4	D	mg/Kg	☼	101	75 - 125

Lab Sample ID: 160-31884-1 MSD
Matrix: Soil
Analysis Batch: 403828

Client Sample ID: B3KL67
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6060	D	981	8461	D X	mg/Kg	☼	245	75 - 125	2	30
Arsenic	2.9	D	98.1	104.9	D	mg/Kg	☼	104	75 - 125	6	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31884-1 MSD — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401975**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	82.7	D	98.1	187.9	D	mg/Kg	☼	107	75 - 125	3	30
Beryllium	0.32	D	9.81	10.79	D	mg/Kg	☼	107	75 - 125	4	30
Cadmium	0.12	D	98.1	99.88	D	mg/Kg	☼	102	75 - 125	3	30
Chromium	8.1	D	98.1	98.60	D	mg/Kg	☼	92	75 - 125	4	30
Cobalt	10.2	D	98.1	111.5	D	mg/Kg	☼	103	75 - 125	5	30
Copper	16.3	D	98.1	117.7	D	mg/Kg	☼	103	75 - 125	4	30
Lead	7.0	D	98.1	105.1	D	mg/Kg	☼	100	75 - 125	2	30
Manganese	364	D N	98.1	507.7	D N	mg/Kg	☼	147	75 - 125	1	30
Molybdenum	0.41	B D	49.0	50.83	D	mg/Kg	☼	103	75 - 125	4	30
Nickel	14.6	D	98.1	115.8	D	mg/Kg	☼	103	75 - 125	8	30
Selenium	2.2	D	49.0	51.82	D	mg/Kg	☼	101	75 - 125	6	30
Silver	0.073	U D	19.6	20.00	D	mg/Kg	☼	102	75 - 125	4	30
Strontium	23.6	D	98.1	128.4	D	mg/Kg	☼	107	75 - 125	2	30
Tin	0.54	D C	98.1	99.03	D	mg/Kg	☼	100	75 - 125	3	30
Uranium	0.47	D	98.1	104.5	D	mg/Kg	☼	106	75 - 125	3	30
Vanadium	66.7	D	98.1	159.7	D	mg/Kg	☼	95	75 - 125	0	30
Zinc	64.8	D	98.1	164.0	D	mg/Kg	☼	101	75 - 125	2	30

Lab Sample ID: MB 160-401979/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:55	11/28/18 21:21	2

Lab Sample ID: LCS 160-401979/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.3	38.43	D	mg/Kg		91	21 - 251

Lab Sample ID: 160-31884-1 MS — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.50	U D	49.5	44.78	D	mg/Kg	☼	90	75 - 125

Lab Sample ID: 160-31884-1 MSD — **Client Sample ID: B3KL67**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.50	U D	48.1	46.43	D	mg/Kg	☼	97	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31884-1
SDG: SL31884-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402414/1-A
Matrix: Solid
Analysis Batch: 402731

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402414

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		11/26/18 09:25	11/26/18 17:11	1

Lab Sample ID: LCSSRM 160-402414/2-A
Matrix: Solid
Analysis Batch: 402731

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402414

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			2.90	2.56	D	mg/Kg		88.1	50.7 - 149.3		

Lab Sample ID: 160-31884-1 MS
Matrix: Soil
Analysis Batch: 402731

Client Sample ID: B3KL67
Prep Type: Total/NA
Prep Batch: 402414

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	1.03	0.949		mg/Kg	☼	93	80 - 120		

Lab Sample ID: 160-31884-1 MSD
Matrix: Soil
Analysis Batch: 402731

Client Sample ID: B3KL67
Prep Type: Total/NA
Prep Batch: 402414

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	0.968	0.915		mg/Kg	☼	95	80 - 120	4	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31887-6 MSD — **Client Sample ID: B3KL82**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401976/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/20/18 19:46	11/30/18 15:54	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/20/18 19:46	11/30/18 15:54	1

Lab Sample ID: LCS 160-401976/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.89	9.31		mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-401976/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	73.20	D	mg/Kg		79.9	53.5 - 124.5

Lab Sample ID: 160-31887-5 MS — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.1	U D N	19.4	6.92	B D N	mg/Kg	☼	36	75 - 125
Lithium	6.8	B D	9.70	17.66	D	mg/Kg	☼	112	75 - 125

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401976**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.1	U D N	20.4	7.93	B D N	mg/Kg	☼	39	75 - 125	14	30
Lithium	6.8	B D	10.2	18.41	D	mg/Kg	☼	114	75 - 125	4	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-401975/1-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401975

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.9	U D	4.7	1.9	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Arsenic	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Barium	0.47	U D	1.9	0.47	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Beryllium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Cadmium	0.022	U D	0.047	0.022	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Chromium	0.42	U D	0.94	0.42	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Cobalt	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Copper	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Lead	0.12	U D	0.28	0.12	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Manganese	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Molybdenum	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Nickel	0.308	B D	0.47	0.19	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Selenium	0.30	U D	0.47	0.30	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Silver	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Strontium	0.22	U D	0.47	0.22	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Tin	0.107	B D	0.19	0.084	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Uranium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Vanadium	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:44	11/30/18 17:27	2
Zinc	1.9	U D	4.7	1.9	mg/Kg		11/20/18 19:44	11/30/18 17:27	2

Lab Sample ID: LCS 160-401975/2-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	88.9	95.73	D	mg/Kg		108	80 - 120

Lab Sample ID: LCSSRM 160-401975/3-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7586	D	mg/Kg		90.7	50.2 - 149.5
Arsenic	161	175.6	D	mg/Kg		109.1	70.2 - 129.8
Barium	260	276.2	D	mg/Kg		106.2	75.0 - 125.0
Beryllium	97.6	105.6	D	mg/Kg		108.2	75.0 - 125.0
Cadmium	211	222.5	D	mg/Kg		105.4	74.9 - 125.1
Chromium	136	145.0	D	mg/Kg		106.6	70.0 - 130.1
Cobalt	48.2	53.53	D	mg/Kg		111.1	74.9 - 124.9
Copper	166	185.7	D	mg/Kg		111.9	74.7 - 124.7
Lead	111	116.6	D	mg/Kg		105.0	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-401975/3-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	239.1	D	mg/Kg		83.0	57.3 - 101.0
Molybdenum	110	119.6	D	mg/Kg		108.7	70.5 - 129.1
Nickel	91.9	103.7	D	mg/Kg		112.9	70.0 - 129.5
Selenium	191	216.8	D	mg/Kg		113.5	68.6 - 131.9
Silver	43.3	45.13	D	mg/Kg		104.2	69.5 - 130.5
Strontium	107	116.2	D	mg/Kg		108.6	72.1 - 128.0
Tin	99.9	103.5	D	mg/Kg		103.6	56.8 - 143.1
Vanadium	56.7	58.64	D	mg/Kg		103.4	56.8 - 143.4
Zinc	199	218.8	D	mg/Kg		109.9	69.8 - 130.2

Lab Sample ID: 160-31887-5 MS
Matrix: Soil
Analysis Batch: 403828

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6510	D	970	8826	D X	mg/Kg	☼	239	75 - 125
Arsenic	3.3	D	97.0	102.6	D	mg/Kg	☼	102	75 - 125
Barium	84.3	D	97.0	199.6	D	mg/Kg	☼	119	75 - 125
Beryllium	0.33	D	9.70	10.70	D	mg/Kg	☼	107	75 - 125
Cadmium	0.097	D	97.0	98.69	D	mg/Kg	☼	102	75 - 125
Chromium	9.3	D	97.0	99.45	D	mg/Kg	☼	93	75 - 125
Cobalt	9.7	D	97.0	108.2	D	mg/Kg	☼	102	75 - 125
Copper	14.1	D	97.0	112.6	D	mg/Kg	☼	102	75 - 125
Lead	5.8	D	97.0	103.7	D	mg/Kg	☼	101	75 - 125
Manganese	383	D	97.0	482.4	D	mg/Kg	☼	103	75 - 125
Molybdenum	0.32	B D	48.5	49.24	D	mg/Kg	☼	101	75 - 125
Nickel	12.1	D	97.0	111.6	D	mg/Kg	☼	103	75 - 125
Selenium	2.2	D	48.5	50.10	D	mg/Kg	☼	99	75 - 125
Silver	0.077	U D	19.4	19.71	D	mg/Kg	☼	102	75 - 125
Strontium	35.1	D	97.0	129.2	D	mg/Kg	☼	97	75 - 125
Tin	0.42	D C	97.0	97.26	D	mg/Kg	☼	100	75 - 125
Uranium	0.51	D	97.0	101.7	D	mg/Kg	☼	104	75 - 125
Vanadium	58.8	D	97.0	151.7	D	mg/Kg	☼	96	75 - 125
Zinc	83.8	D	97.0	181.3	D	mg/Kg	☼	101	75 - 125

Lab Sample ID: 160-31887-5 MSD
Matrix: Soil
Analysis Batch: 403828

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 401975

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6510	D	1020	9080	D X	mg/Kg	☼	252	75 - 125	3	30
Arsenic	3.3	D	102	111.9	D	mg/Kg	☼	106	75 - 125	9	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401975**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	84.3	D	102	199.0	D	mg/Kg	☼	112	75 - 125	0	30
Beryllium	0.33	D	10.2	11.41	D	mg/Kg	☼	108	75 - 125	6	30
Cadmium	0.097	D	102	104.7	D	mg/Kg	☼	102	75 - 125	6	30
Chromium	9.3	D	102	106.4	D	mg/Kg	☼	95	75 - 125	7	30
Cobalt	9.7	D	102	112.2	D	mg/Kg	☼	100	75 - 125	4	30
Copper	14.1	D	102	117.5	D	mg/Kg	☼	101	75 - 125	4	30
Lead	5.8	D	102	109.3	D	mg/Kg	☼	101	75 - 125	5	30
Manganese	383	D	102	501.9	D	mg/Kg	☼	117	75 - 125	4	30
Molybdenum	0.32	B D	51.1	52.40	D	mg/Kg	☼	102	75 - 125	6	30
Nickel	12.1	D	102	116.5	D	mg/Kg	☼	102	75 - 125	4	30
Selenium	2.2	D	51.1	52.41	D	mg/Kg	☼	98	75 - 125	5	30
Silver	0.077	U D	20.4	20.83	D	mg/Kg	☼	102	75 - 125	6	30
Strontium	35.1	D	102	136.0	D	mg/Kg	☼	99	75 - 125	5	30
Tin	0.42	D C	102	103.0	D	mg/Kg	☼	100	75 - 125	6	30
Uranium	0.51	D	102	108.1	D	mg/Kg	☼	105	75 - 125	6	30
Vanadium	58.8	D	102	160.6	D	mg/Kg	☼	100	75 - 125	6	30
Zinc	83.8	D	102	188.9	D	mg/Kg	☼	103	75 - 125	4	30

Lab Sample ID: MB 160-401979/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:55	11/28/18 21:21	2

Lab Sample ID: LCS 160-401979/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.3	38.43	D	mg/Kg		91	21 - 251

Lab Sample ID: 160-31887-5 MS — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.48	U D	49.2	46.44	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-31887-5 MSD — **Client Sample ID: B3KL78**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403246 — **Prep Batch: 401979**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.48	U D	48.5	45.58	D	mg/Kg	☼	94	75 - 125	2	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-043

TestAmerica Job ID: 160-31887-1
SDG: SL31887-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402414/1-A
Matrix: Solid
Analysis Batch: 402731

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402414

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		11/26/18 09:25	11/26/18 17:11	1

Lab Sample ID: LCSSRM 160-402414/2-A
Matrix: Solid
Analysis Batch: 402731

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402414

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			2.90	2.56	D	mg/Kg		88.1	50.7 - 149.3		

Lab Sample ID: 160-31887-5 MS
Matrix: Soil
Analysis Batch: 402731

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 402414

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	0.979	0.884		mg/Kg	☼	90	80 - 120		

Lab Sample ID: 160-31887-5 MSD
Matrix: Soil
Analysis Batch: 402731

Client Sample ID: B3KL78
Prep Type: Total/NA
Prep Batch: 402414

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	0.962	0.884		mg/Kg	☼	92	80 - 120	0	30

Date: 08 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8699-1, RL8711-1, RL8745-1

INTRODUCTION

This memorandum presents the results of data validation for SDG RL8699-1, RL8711-1, RL8745-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3KL21	11/12/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL32	11/12/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL37	11/12/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL20	11/12/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL33	11/12/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL29	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL38	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL27	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL28	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL26	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL22	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL25	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL24	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL23	11/13/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL31	11/14/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL35	11/14/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL36	11/14/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL34	11/14/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3KL30	11/14/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil/solid analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception.

For SDG RL8699-1, the LCS recovery for Pu-239/240 was above the acceptance limit. All associated sample results were < the MDCs and should not be qualified as a result.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable with the following exceptions.

For SDG RL8711-1, the Pu-242 tracer recovery for the method blank was > the upper acceptance limit and the U-232 tracer recovery for the LCS was < the lower acceptance limit. Since the MB and LCS are QC samples, data should not be qualified as a result.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs, the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable with the following exceptions.

For SDG RL8711-1, the RPD for U-233/240 was > the upper acceptance limit; however the sample results were <5X the MDCs and the difference between results were <2X the MDC, therefore data should not be qualified as a result.

Field Duplicate Samples

All field duplicate results were acceptable with the following exceptions.

Samples B3KL22 and B3KL38 had a U-233/234 RPD of 44%; however the results for both samples were <5X the MDC and difference was <2X the MDC. The Pu-241 result for sample B3KL22 was < the MDC and the result for sample B3KL38 was 3.62 pCi/g.

The U-233/234 result for sample B3KL37 was < the MDC and the result for sample B3KL32 was 0236 pCi/g.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDL were not provided.

- **Completeness**

SDGs RL8699-1, RL8711-1 and RL8745-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage for the remaining radiochemical analytes was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8699-1, RL8711-1, RL8745-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E

Project: RTL	Data Package: VSR19-011
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/08/19
	SDG: RL8699-1, RL8711-1, RL8745-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	X Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Pu-241			

Samples/Matrix Soil

SDG RL8699-1: B3KL21, B3KL32, B3KL37, B3KL20, B3KL33

SDG RL8711-1: B3KL29, B3KL38, B3KL27, B3KL28, B3KL26, B3KL22, B3KL25, B3KL24, B3KL23

SDG RL8745-1: B3KL31, B3KL35, B3KL36, B3KL34, B3KL30

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG RL8699-1: Pu-239/240 141%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☐ N/A
Chemical carrier added?	Yes No (N/A)
Chemical recovery acceptable?	Yes No (N/A)
Chemical carrier traceable? (Levels D, E)	Yes No (N/A)
Chemical carrier expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	(Yes) No N/A
Tracer recovery acceptable?	Yes (No) N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG RL8711-1: Pu242(tracer) MB 106%; U-232 (tracer) LCS 28%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No N/A
Spike recoveries acceptable?	Yes No N/A
Spike source traceable? (Levels D, E)	Yes No N/A
Spike source expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	Yes No N/A
RPD values acceptable?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG RL8711-1: RPD U-233/234 49% (both results <5X MDC difference <2X MDC)

Numerous RPDs >30%; however results were <MDCs.

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split sample(s) analyzed?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

B3KL22/B3KL38 U-233/234 44% (results <5X MDCs difference <2X MDCs) Pu-241 -0.35U/3.62

B3KL32/B3KL37: U-233/234 0.236/0.0501U

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	Yes No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	Yes No N/A
Results supported in raw data?(Levels D, E)	Yes No N/A
Results acceptable? (Levels D, E)	Yes No N/A
MDC's meet required reporting limits?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (20-115)
300-8699-1	B3KL21	95.9
300-8699-2	B3KL32	97.3
300-8699-2 DU	B3KL32	111
300-8699-3	B3KL37	95.0
300-8699-4	B3KL20	91.9
300-8699-5	B3KL33	95.4
LCS 300-15830/2-A	Lab Control Sample	99.4
MB 300-15830/1-A	Method Blank	115

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (20-115)
300-8699-1	B3KL21	66.2
300-8699-2	B3KL32	44.9
300-8699-3	B3KL37	43.6
300-8699-3 DU	B3KL37	49.3
300-8699-4	B3KL20	83.2
300-8699-5	B3KL33	87.6
LCS 300-15835/2-A	Lab Control Sample	29.8
MB 300-15835/1-A	Method Blank	34.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8699-1	B3KL21	95.9
300-8699-2	B3KL32	97.3
300-8699-2 DU	B3KL32	111
300-8699-3	B3KL37	95.0
300-8699-4	B3KL20	91.9
300-8699-5	B3KL33	95.4
LCS 300-15889/2-A	Lab Control Sample	99.4
MB 300-15889/1-A	Method Blank	115

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8699-1
SDG: RL8699-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15825/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0211	U		0.0837		0.0493	pCi/g	11/14/18 09:45	11/15/18 15:21	1

Lab Sample ID: LCS 300-15825/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.65	2.430		0.189		0.0944	pCi/g	92	75 - 125		

Lab Sample ID: 300-8699-1 DU — **Client Sample ID: B3KL21**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 15920 — **Prep Batch: 15825**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.056	U		-0.0104	U	0.0903		0.0860	pCi/g			138	35

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15835/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16024 — **Prep Batch: 15835**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.0152	U	0.0695	0.0696	1.00	0.180	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-233/234	-0.00552	U	0.0691	0.0691	1.00	0.150	pCi/g	11/14/18 11:12	11/19/18 09:01	1
U-235/236	-0.00276	U	0.0690	0.0690	1.00	0.136	pCi/g	11/14/18 11:12	11/19/18 09:01	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*34.4*		*20 - 115*	*11/14/18 11:12*	*11/19/18 09:01*	*1*

Lab Sample ID: LCS 300-15835/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16024 — **Prep Batch: 15835**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			1.80	1.330	o	0.550	1.00	0.199	pCi/g	74	75 - 125		
U-233/234			1.72	1.739		0.654	1.00	0.194	pCi/g	101	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*29.8*		*20 - 115*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8699-3 DU
Matrix: Solid
Analysis Batch: 16024

Client Sample ID: B3KL37
Prep Type: Total/NA
Prep Batch: 15835

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	-0.0065	U o		0.0953	o y	0.0969	1.00	0.0874	pCi/g			230	35
U-233/234	0.0501	U		0.114	y	0.109	1.00	0.107	pCi/g			78	35
U-235/236	-0.0011	U		-0.000953	U	0.0477	1.00	0.0874	pCi/g			13	

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*49.3*		*20 - 115*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15830/1-A
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15830

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00114	U	0.0286	0.0286	1.00	0.0649	pCi/g	11/14/18 10:19	11/21/18 15:59	1
Pu-239/240	-0.00457	U	0.0287	0.0287	1.00	0.0805	pCi/g	11/14/18 10:19	11/21/18 15:59	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*115*		*20 - 115*	*11/14/18 10:19*	*11/21/18 15:59*	*1*

Lab Sample ID: LCS 300-15830/2-A
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15830

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.908	1.280	o	0.358	1.00	0.0724	pCi/g	141	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*99.4*		*20 - 115*

Lab Sample ID: 300-8699-2 DU
Matrix: Solid
Analysis Batch: 16039

Client Sample ID: B3KL32
Prep Type: Total/NA
Prep Batch: 15830

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0028	U		-0.00525	U y	0.0265	1.00	0.0749	pCi/g			59	35
Pu-239/240	-0.0040	U o		-0.000525	U o y	0.0263	1.00	0.0536	pCi/g			153	35

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*111*		*20 - 115*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15889/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16165 — **Prep Batch: 15889**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.980	U	0.105	1.48	15.0	2.41	pCi/g	11/15/18 14:21	11/26/18 17:08	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*115*			*11/15/18 14:21*	*11/26/18 17:08*	*1*

Lab Sample ID: LCS 300-15889/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16165 — **Prep Batch: 15889**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			224	242.1		16.1	15.0	2.45	pCi/g	108	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*99.4*		

Lab Sample ID: 300-8699-2 DU — **Client Sample ID: B3KL32**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16165 — **Prep Batch: 15889**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.66	U		0.00649	U y	1.51	15.0	2.41	pCi/g			204	35

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*111*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8711-1	B3KL29	85.4
300-8711-2	B3KL38	95.7
300-8711-2 DU	B3KL38	102
300-8711-3	B3KL27	96.3
300-8711-4	B3KL28	85.6
300-8711-5	B3KL26	93.2
300-8711-6	B3KL22	102
300-8711-7	B3KL25	101
300-8711-8	B3KL24	101
300-8711-9	B3KL23	105
LCS 300-15882/2-A	Lab Control Sample	96.5
MB 300-15882/1-A	Method Blank	106 X

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8711-1	B3KL29	49.2
300-8711-2	B3KL38	51.1
300-8711-3	B3KL27	69.8
300-8711-3 DU	B3KL27	78.7
300-8711-4	B3KL28	73.6
300-8711-5	B3KL26	61.8
300-8711-6	B3KL22	72.3
300-8711-7	B3KL25	81.7
300-8711-8	B3KL24	64.9
300-8711-9	B3KL23	89.8
LCS 300-15887/2-A	Lab Control Sample	27.7 X
MB 300-15887/1-A	Method Blank	51.8

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8711-1	B3KL29	85.4
300-8711-2	B3KL38	95.7
300-8711-2 DU	B3KL38	102
300-8711-3	B3KL27	96.3
300-8711-4	B3KL28	85.6
300-8711-5	B3KL26	93.2

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8711-6	B3KL22	102							
300-8711-7	B3KL25	101							
300-8711-8	B3KL24	101							
300-8711-9	B3KL23	105							
LCS 300-15886/2-A	Lab Control Sample	96.5							
MB 300-15886/1-A	Method Blank	106							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8711-1
SDG: RL8711-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15872/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0344	U		0.0833	0.370	0.0487	pCi/g	11/15/18 10:56	11/16/18 08:47	1

Lab Sample ID: LCS 300-15872/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.65	2.922		0.222	0.370	0.114	pCi/g	110	80 - 120

Lab Sample ID: 300-8711-1 DU — **Client Sample ID: B3KL29**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16015 — **Prep Batch: 15872**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.029	U	0.0235	U y	0.0929	0.370	0.0992	pCi/g	2088	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15887/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16025 — **Prep Batch: 15887**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00925	U	0.0424	0.0424	1.00	0.110	pCi/g	11/15/18 14:05	11/20/18 15:31	1
U-233/234	-0.00336	U	0.0422	0.0422	1.00	0.0913	pCi/g	11/15/18 14:05	11/20/18 15:31	1
U-235/236	-0.00168	U	0.0421	0.0421	1.00	0.0830	pCi/g	11/15/18 14:05	11/20/18 15:31	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*51.8*		*30 - 105*	*11/15/18 14:05*	*11/20/18 15:31*	*1*

Lab Sample ID: LCS 300-15887/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16025 — **Prep Batch: 15887**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	1.85	1.646		0.658	1.00	0.194	pCi/g	89	80 - 120
U-233/234	1.76	1.778		0.693	1.00	0.201	pCi/g	101	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*27.7*	*X*	*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8711-3 DU
Matrix: Solid
Analysis Batch: 16025

Client Sample ID: B3KL27
Prep Type: Total/NA
Prep Batch: 15887

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.182			0.159		0.0999	1.00	0.0576	pCi/g			13	30
U-233/234	0.0967			0.159	y	0.0999	1.00	0.0576	pCi/g			49	30
U-235/236	-0.0028	U		-0.000583	U y	0.0292	1.00	0.0535	pCi/g			131	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*78.7*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15882/1-A
Matrix: Solid
Analysis Batch: 16100

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15882

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0120	U	0.0288	0.0288	1.00	0.0659	pCi/g	11/15/18 13:07	11/20/18 15:29	1
Pu-239/240	-0.00287	U	0.0288	0.0288	1.00	0.0684	pCi/g	11/15/18 13:07	11/20/18 15:29	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*106*	*X*	*30 - 105*	*11/15/18 13:07*	*11/20/18 15:29*	*1*

Lab Sample ID: LCS 300-15882/2-A
Matrix: Solid
Analysis Batch: 16100

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15882

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.890	1.042		0.289	1.00	0.0510	pCi/g	117	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*96.5*		*30 - 105*

Lab Sample ID: 300-8711-2 DU
Matrix: Solid
Analysis Batch: 16100

Client Sample ID: B3KL38
Prep Type: Total/NA
Prep Batch: 15882

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0287	U		0.000513	U y	0.0262	1.00	0.0822	pCi/g			193	30
Pu-239/240	-0.0016	U		0.0113	U y	0.0258	1.00	0.0544	pCi/g			267	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*102*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15886/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.257	U	0.0703	1.40	15.0	2.28	pCi/g	11/15/18 14:03	11/28/18 18:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*106*			*11/15/18 14:03*	*11/28/18 18:32*	*1*

Lab Sample ID: LCS 300-15886/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			221	209.9		13.5	15.0	2.21	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*96.5*		

Lab Sample ID: 300-8711-2 DU — **Client Sample ID: B3KL38**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16232 — **Prep Batch: 15886**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	3.62			1.931	U y	1.36	15.0	2.02	pCi/g			61	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*102*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8745-1	B3KL31	99.5
300-8745-1 DU	B3KL31	103
300-8745-2	B3KL35	97.5
300-8745-3	B3KL36	94.4
300-8745-4	B3KL34	85.3
300-8745-5	B3KL30	92.0
MB 300-16032/1-A	Method Blank	91.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8745-1	B3KL31	85.9
300-8745-1 DU	B3KL31	62.5
300-8745-2	B3KL35	74.7
300-8745-3	B3KL36	78.6
300-8745-4	B3KL34	91.9
300-8745-5	B3KL30	82.0
LCS 300-16046/2-A	Lab Control Sample	81.7
MB 300-16046/1-A	Method Blank	57.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8745-1	B3KL31	99.5
300-8745-1 DU	B3KL31	103
300-8745-2	B3KL35	97.5
300-8745-3	B3KL36	94.4
300-8745-4	B3KL34	85.3
300-8745-5	B3KL30	92.0
LCS 300-16035/2-A	Lab Control Sample	98.8
MB 300-16035/1-A	Method Blank	91.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15971/1-A
Matrix: Solid
Analysis Batch: 16516

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15971

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00378	U		0.00756	0.370	0.0293	pCi/g	11/20/18 13:49	11/20/18 17:00	1

Lab Sample ID: LCS 300-15971/2-A
Matrix: Solid
Analysis Batch: 16516

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 15971

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.65	2.494		0.192	0.370	0.0868	pCi/g	94	80 - 120

Lab Sample ID: 300-8745-1 DU
Matrix: Solid
Analysis Batch: 16516

Client Sample ID: B3KL31
Prep Type: Total/NA
Prep Batch: 15971

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.038	U	0.0255	U y	0.0961	0.370	0.104	pCi/g	1020	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16046/1-A
Matrix: Solid
Analysis Batch: 16295

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16046

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0170	U	0.0642	0.0642	1.00	0.151	pCi/g	11/23/18 10:04	12/03/18 11:48	1
U-233/234	-0.00359	U	0.0450	0.0450	1.00	0.0973	pCi/g	11/23/18 10:04	12/03/18 11:48	1
U-235/236	-0.000897	U	0.0449	0.0449	1.00	0.0823	pCi/g	11/23/18 10:04	12/03/18 11:48	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*57.7*		*30 - 105*	*11/23/18 10:04*	*12/03/18 11:48*	*1*

Lab Sample ID: LCS 300-16046/2-A
Matrix: Solid
Analysis Batch: 16295

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16046

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	1.81	1.873		0.446	1.00	0.0587	pCi/g	103	80 - 120
U-233/234	1.73	2.050		0.476	1.00	0.0669	pCi/g	118	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*81.7*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8745-1 DU
Matrix: Solid
Analysis Batch: 16295

Client Sample ID: B3KL31
Prep Type: Total/NA
Prep Batch: 16046

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0731			0.0807	U	0.0866	1.00	0.113	pCi/g			10	30
U-233/234	0.138			0.0876	U y	0.0867	1.00	0.0975	pCi/g			44	30
U-235/236	0.0121	U		-0.00152	U y	0.0381	1.00	0.0752	pCi/g			258	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*62.5*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16032/1-A
Matrix: Solid
Analysis Batch: 16338

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16032

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00288	U	0.0361	0.0361	1.00	0.0781	pCi/g	11/23/18 08:44	12/04/18 10:19	1
Pu-239/240	-0.00432	U	0.0361	0.0361	1.00	0.0835	pCi/g	11/23/18 08:44	12/04/18 10:19	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.5*		*30 - 105*	*11/23/18 08:44*	*12/04/18 10:19*	*1*

Lab Sample ID: LCS 300-16032/2-A
Matrix: Solid
Analysis Batch: 16338

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16032

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			1.11	1.032		0.343	1.00	0.0821	pCi/g	93	80 - 120		

Lab Sample ID: 300-8745-1 DU
Matrix: Solid
Analysis Batch: 16338

Client Sample ID: B3KL31
Prep Type: Total/NA
Prep Batch: 16032

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0036	U		-0.00297	U	0.0249	1.00	0.0591	pCi/g			20	30
Pu-239/240	-0.0091	U o		-0.00297	U o y	0.0249	1.00	0.0591	pCi/g			102	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*103*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-042

TestAmerica Job ID: 300-8745-1
SDG: RL8745-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16035/1-A
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16035

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.758	U	0.0744	1.40	15.0	2.32	pCi/g	11/23/18 09:46	12/11/18 17:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.5*			*11/23/18 09:46*	*12/11/18 17:47*	*1*

Lab Sample ID: LCS 300-16035/2-A
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16035

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	242.6		15.6	15.0	2.15	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*98.8*		

Lab Sample ID: 300-8745-1 DU
Matrix: Solid
Analysis Batch: 16728

Client Sample ID: B3KL31
Prep Type: Total/NA
Prep Batch: 16035

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.96	U		-0.546	U y	1.16	15.0	1.92	pCi/g			55	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*103*		

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	01/29/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-017		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval

01/29/2019 — Date

Scot Fitzgerald — Organization Manager (optional) (print and sign)

10. Agreement With Indicated Comment Disposition(s)

Date

Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

1/29/19 — Date

Reviewer/Point of Contact (print and sign)

Scot Fitzgerald — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	For SDG SL32122-1, the LCS failure for Isophrone is not discussed in the narrative or in the qualification summary		Add the LCS failure for Isophrone in the two sections.	Y		closed
2	For SDG SL32143-1 LCS failure for Endosulfan I is not discussed in the narrative or in the qualification summary		Add the LCS failure for Endosulfan I in the two sections.	Y		closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
1/29/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-017 VSR19-017 Rev 1		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/29/2019 Jadie Kaas Date / Organization Manager (optional) (print and sign)	Reviewer/Point of Contact (print and sign) Date Author/Originator (print and sign)	1/29/19 Jadie Kaas Date / Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No other issues noted than the Two comments reported on Scot Fitzgerald's RCR dated 1/29/19					Closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-017
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-28-2019**

Technical Review By: Ellen McEntee **Date: 01-29-2019**

Quality Review By: Mary A. Donivan **Date: 01-29-2019**
Mary Donivan
Quality Assurance Manager

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Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Group (SDGs) SL32122-1, SL32143-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32122-1 and SL32143-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1W7	12/03/18	Soil	C	8260C
B3L1X3	12/03/18	Soil	C	8260C
B3L222	12/03/18	Soil	C	8260C
B3L1X9	12/03/18	Soil	C	8260C
B3L1X6	12/03/18	Soil	C	8260C
B3L229	12/03/18	Soil	C	8260C
B3L230	12/04/18	Soil	C	8260C
B3L207	12/04/18	Soil	C	8260C
B3L1X0	12/04/18	Soil	C	8260C
B3L1Y2	12/04/18	Soil	C	8260C
B3L213	12/04/18	Soil	C	8260C
B3L219	12/04/18	Soil	C	8260C
B3L1V8	12/04/18	Soil	C	8260C
B3L1V2	12/04/18	Soil	C	8260C
B3L1Y5	12/04/18	Soil	C	8260C
B3L225	12/04/18	Soil	C	8260C
B3L210	12/04/18	Soil	C	8260C
B3L1Y8	12/04/18	Soil	C	8260C
B3L216	12/04/18	Soil	C	8260C
B3L1W4	12/04/18	Soil	C	8260C
B3L201	12/04/18	Soil	C	8260C
B3L204	12/04/18	Soil	C	8260C
B3L1W1	12/04/18	Soil	C	8260C
B3L1V5	12/04/18	Soil	C	8260C
B3L1T9	12/04/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

All trip blanks results were acceptable.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exception.

For SDG SL32143-1, the 4-bromofluorobenzene surrogate recovery for sample B3L201 was above the upper acceptance limit. All results associated with the surrogate were non-detects and data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the MSD recovery for chloroethane was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

SDG SL32143-1
The MS and MSD recoveries for 2-hexanone and chloroethane were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for acetone were above the upper acceptance limit. The acetone result for samples B3L230, B3L225 and B3L210 were detects and should be qualified as estimates and flagged "J."

Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the LCS and LCSD recoveries for chloroethane were below the lower acceptance limit but ≥40%. . All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32143-1, the LCS and LCSD recoveries for chloroethane were below the lower acceptance limit but ≥40%. . All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

LCS/LCSD Samples

All LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The CRDL for methylene chloride was met. No other VOC CRDLs were provided in the SAP.

- **Completeness**

SDGs SL32122-1 and SL32143-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to matrix spike and LCS infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDGs: SL32122-1, SL32143-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
chloroethane	UJ	B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6, B3L229, B3L230, B3L207, B3L1X0, B3L1Y2, B3L213, B3L219, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L216, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9	Low matrix spike recoveries and low LCS and LCSD recoveries
2-hexanone	UJ	B3L230, B3L207, B3L1X0, B3L1Y2, B3L213, B3L219, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L216, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9	Low matrix spike recoveries
acetone	J	B3L230, B3L225, B3L210	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/28/19	
			SDG: SL32122-1, SL32143-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SL32122-1: B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6, B3L229					
SL32143-1: B3L230, B3L207, B3L1X0, B3L1Y2, B3L213, B3L219, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L216, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	(Yes) No N/A
Field/trip blank results acceptable? (Levels C, D, E)	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SL32143-1:B3L201 BFB 131%

MS/MSD

SL32122-1: chloroethane 69% (MSD)

SL32143-1: 2-hexanone 57%/53%, acetone 259%/289%, chloroethane 67%/68%

LCS/LCSD

SL32122-1: chloroethane 67%/67%

SL32143-1: chloroethane 62%/65%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD RPD values acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No (N/A)
Internal standard areas acceptable?	Yes No (N/A)
Internal standard retention times acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDL for methylene chloride were met, no other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-406161/8
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/17/18 14:05	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/17/18 14:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/17/18 14:05	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/17/18 14:05	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/17/18 14:05	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/17/18 14:05	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/17/18 14:05	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/17/18 14:05	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/17/18 14:05	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/17/18 14:05	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/17/18 14:05	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/17/18 14:05	1
Acetone	6.5	U	20	6.5	ug/Kg			12/17/18 14:05	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/17/18 14:05	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/17/18 14:05	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/17/18 14:05	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/17/18 14:05	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/17/18 14:05	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/17/18 14:05	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/17/18 14:05	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/17/18 14:05	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/17/18 14:05	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/17/18 14:05	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/17/18 14:05	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/17/18 14:05	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/17/18 14:05	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/17/18 14:05	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/17/18 14:05	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/17/18 14:05	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/17/18 14:05	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/17/18 14:05	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/17/18 14:05	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/17/18 14:05	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/17/18 14:05	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/17/18 14:05*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*		*12/17/18 14:05*	*1*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*		*12/17/18 14:05*	*1*
Dibromofluoromethane (Surr)	*98*		*53 - 143*		*12/17/18 14:05*	*1*
Toluene-d8 (Surr)	*98*		*74 - 135*		*12/17/18 14:05*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406161/5
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	47.4		ug/Kg		95	71 - 127
1,1,2,2-Tetrachloroethane	50.0	48.7		ug/Kg		97	52 - 140
1,1,2-Trichloroethane	50.0	51.6		ug/Kg		103	79 - 122
1,1-Dichloroethane	50.0	49.9		ug/Kg		100	80 - 120
1,1-Dichloroethene	50.0	54.3		ug/Kg		109	71 - 126
1,2-Dichloroethane	50.0	43.9		ug/Kg		88	68 - 128
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121
1,2-Dichloropropane	50.0	54.1		ug/Kg		108	80 - 126
2-Butanone (MEK)	50.0	47.8		ug/Kg		96	41 - 140
2-Hexanone	50.0	43.6		ug/Kg		87	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	40.3		ug/Kg		81	39 - 140
Benzene	50.0	51.7		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	49.2		ug/Kg		98	78 - 124
Bromoform	50.0	46.6		ug/Kg		93	67 - 135
Bromomethane	50.0	41.0		ug/Kg		82	61 - 132
Carbon disulfide	50.0	53.6		ug/Kg		107	74 - 124
Carbon tetrachloride	50.0	46.3		ug/Kg		93	68 - 130
Chlorobenzene	50.0	49.9		ug/Kg		100	80 - 120
Chloroethane	50.0	33.5	o	ug/Kg		67	73 - 129
Chloroform	50.0	47.0		ug/Kg		94	78 - 120
Chloromethane	50.0	46.2		ug/Kg		92	69 - 123
cis-1,3-Dichloropropene	50.0	56.9		ug/Kg		114	78 - 127
Dibromochloromethane	50.0	50.6		ug/Kg		101	77 - 126
Ethylbenzene	50.0	49.7		ug/Kg		99	79 - 126
Methylene Chloride	50.0	54.4		ug/Kg		109	76 - 120
Styrene	50.0	55.9		ug/Kg		112	80 - 129
Tetrachloroethene	50.0	51.4		ug/Kg		103	76 - 126
Toluene	50.0	54.9		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	52.8		ug/Kg		106	77 - 136
Trichloroethene	50.0	50.1		ug/Kg		100	66 - 130
Vinyl chloride	50.0	41.2		ug/Kg		82	56 - 134
Xylenes, Total	100	111		ug/Kg		111	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*96*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Lab Sample ID: LCSD 160-406161/6
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	47.7		ug/Kg		95	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	49.8		ug/Kg		100	52 - 140	2	20
1,1,2-Trichloroethane	50.0	50.2		ug/Kg		100	79 - 122	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406161/6
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	49.7		ug/Kg		99	80 - 120	0	20
1,1-Dichloroethene	50.0	53.9		ug/Kg		108	71 - 126	1	20
1,2-Dichloroethane	50.0	44.0		ug/Kg		88	68 - 128	0	20
1,2-Dichloroethene, Total	100	114		ug/Kg		114	79 - 121	1	20
1,2-Dichloropropane	50.0	54.1		ug/Kg		108	80 - 126	0	20
2-Butanone (MEK)	50.0	46.6		ug/Kg		93	41 - 140	3	20
2-Hexanone	50.0	41.9		ug/Kg		84	63 - 136	4	20
4-Methyl-2-pentanone (MIBK)	50.0	42.7		ug/Kg		85	67 - 130	1	20
Acetone	50.0	38.0		ug/Kg		76	39 - 140	6	20
Benzene	50.0	51.9		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	49.4		ug/Kg		99	78 - 124	0	20
Bromoform	50.0	48.8		ug/Kg		98	67 - 135	5	20
Bromomethane	50.0	40.6		ug/Kg		81	61 - 132	1	20
Carbon disulfide	50.0	53.8		ug/Kg		108	74 - 124	0	20
Carbon tetrachloride	50.0	47.2		ug/Kg		94	68 - 130	2	20
Chlorobenzene	50.0	50.9		ug/Kg		102	80 - 120	2	20
Chloroethane	50.0	33.6	o	ug/Kg		67	73 - 129	0	20
Chloroform	50.0	46.8		ug/Kg		94	78 - 120	0	20
Chloromethane	50.0	44.9		ug/Kg		90	69 - 123	3	20
cis-1,3-Dichloropropene	50.0	57.3		ug/Kg		115	78 - 127	1	20
Dibromochloromethane	50.0	49.4		ug/Kg		99	77 - 126	2	20
Ethylbenzene	50.0	49.9		ug/Kg		100	79 - 126	1	20
Methylene Chloride	50.0	55.8		ug/Kg		112	76 - 120	2	20
Styrene	50.0	56.7		ug/Kg		113	80 - 129	2	20
Tetrachloroethene	50.0	51.1		ug/Kg		102	76 - 126	1	20
Toluene	50.0	55.7		ug/Kg		111	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	52.0		ug/Kg		104	77 - 136	1	20
Trichloroethene	50.0	49.8		ug/Kg		100	66 - 130	1	20
Vinyl chloride	50.0	39.5		ug/Kg		79	56 - 134	4	20
Xylenes, Total	100	112		ug/Kg		112	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-32122-2 MS
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3L1X3
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.49	U	51.7	49.9		ug/Kg	☼	96	80 - 120
1,1,2,2-Tetrachloroethane	2.2	U	51.7	47.6		ug/Kg	☼	92	78 - 120
1,1,2-Trichloroethane	1.3	U	51.7	52.8		ug/Kg	☼	102	80 - 120
1,1-Dichloroethane	0.45	U	51.7	52.3		ug/Kg	☼	101	80 - 120
1,1-Dichloroethene	1.8	U	51.7	56.4		ug/Kg	☼	109	78 - 121
1,2-Dichloroethane	0.99	U	51.7	46.6		ug/Kg	☼	90	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32122-2 MS
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3L1X3
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.5	U	103	118		ug/Kg	☼	114	80 - 120
1,2-Dichloropropane	0.69	U	51.7	56.6		ug/Kg	☼	109	80 - 120
2-Butanone (MEK)	2.2	U	51.7	46.6		ug/Kg	☼	90	69 - 124
2-Hexanone	3.8	U	51.7	39.8		ug/Kg	☼	77	62 - 118
4-Methyl-2-pentanone (MIBK)	2.9	U	51.7	42.1		ug/Kg	☼	81	73 - 125
Acetone	7.4	U	51.7	61.0		ug/Kg	☼	118	54 - 139
Benzene	0.29	U	51.7	54.4		ug/Kg	☼	105	80 - 120
Bromodichloromethane	0.57	U	51.7	51.9		ug/Kg	☼	100	80 - 120
Bromoform	2.2	U	51.7	51.9		ug/Kg	☼	100	80 - 125
Bromomethane	2.7	U	51.7	44.1		ug/Kg	☼	85	70 - 126
Carbon disulfide	0.79	U	51.7	55.8		ug/Kg	☼	108	79 - 121
Carbon tetrachloride	0.58	U	51.7	48.9		ug/Kg	☼	95	80 - 120
Chlorobenzene	0.93	U	51.7	52.7		ug/Kg	☼	102	80 - 120
Chloroethane	2.2	U o	51.7	36.2		ug/Kg	☼	70	64 - 133
Chloroform	0.43	U	51.7	49.1		ug/Kg	☼	95	80 - 120
Chloromethane	0.74	U	51.7	46.7		ug/Kg	☼	90	75 - 120
cis-1,3-Dichloropropene	2.4	U	51.7	59.0		ug/Kg	☼	114	80 - 120
Dibromochloromethane	1.4	U	51.7	51.3		ug/Kg	☼	99	80 - 120
Ethylbenzene	0.79	U	51.7	51.6		ug/Kg	☼	100	80 - 120
Methylene Chloride	1.8	U	51.7	56.4		ug/Kg	☼	109	77 - 123
Styrene	2.2	U	51.7	57.7		ug/Kg	☼	112	80 - 120
Tetrachloroethene	0.64	U	51.7	52.1		ug/Kg	☼	101	80 - 120
Toluene	2.9	U	51.7	57.9		ug/Kg	☼	112	80 - 124
trans-1,3-Dichloropropene	2.0	U	51.7	54.1		ug/Kg	☼	104	80 - 122
Trichloroethene	0.45	U	51.7	56.7		ug/Kg	☼	110	79 - 120
Vinyl chloride	0.49	U	51.7	42.1		ug/Kg	☼	81	71 - 120
Xylenes, Total	0.97	U	103	116		ug/Kg	☼	112	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*85*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*94*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Lab Sample ID: 160-32122-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3L1X3
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.49	U	48.1	45.8		ug/Kg	☼	95	80 - 120	9	20
1,1,2,2-Tetrachloroethane	2.2	U	48.1	44.0		ug/Kg	☼	92	78 - 120	8	20
1,1,2-Trichloroethane	1.3	U	48.1	50.4		ug/Kg	☼	105	80 - 120	5	20
1,1-Dichloroethane	0.45	U	48.1	48.3		ug/Kg	☼	100	80 - 120	8	20
1,1-Dichloroethene	1.8	U	48.1	52.8		ug/Kg	☼	110	78 - 121	7	20
1,2-Dichloroethane	0.99	U	48.1	43.5		ug/Kg	☼	91	78 - 117	7	20
1,2-Dichloroethene, Total	1.5	U	96.2	108		ug/Kg	☼	113	80 - 120	9	20
1,2-Dichloropropane	0.69	U	48.1	52.3		ug/Kg	☼	109	80 - 120	8	20
2-Butanone (MEK)	2.2	U	48.1	42.6		ug/Kg	☼	88	69 - 124	9	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32122-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3L1X3
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.8	U	48.1	39.6		ug/Kg	☼	82	62 - 118	0	20
4-Methyl-2-pentanone (MIBK)	2.9	U	48.1	40.7		ug/Kg	☼	85	73 - 125	3	20
Acetone	7.4	U	48.1	57.1		ug/Kg	☼	119	54 - 139	6	20
Benzene	0.29	U	48.1	49.9		ug/Kg	☼	104	80 - 120	9	20
Bromodichloromethane	0.57	U	48.1	48.0		ug/Kg	☼	100	80 - 120	8	20
Bromoform	2.2	U	48.1	49.6		ug/Kg	☼	103	80 - 125	5	20
Bromomethane	2.7	U	48.1	40.5		ug/Kg	☼	84	70 - 126	9	20
Carbon disulfide	0.79	U	48.1	51.6		ug/Kg	☼	107	79 - 121	8	20
Carbon tetrachloride	0.58	U	48.1	45.5		ug/Kg	☼	95	80 - 120	7	20
Chlorobenzene	0.93	U	48.1	48.9		ug/Kg	☼	102	80 - 120	7	20
Chloroethane	2.2	U o	48.1	33.1		ug/Kg	☼	69	64 - 133	9	20
Chloroform	0.43	U	48.1	45.9		ug/Kg	☼	95	80 - 120	7	20
Chloromethane	0.74	U	48.1	43.4		ug/Kg	☼	90	75 - 120	7	20
cis-1,3-Dichloropropene	2.4	U	48.1	55.3		ug/Kg	☼	115	80 - 120	6	20
Dibromochloromethane	1.4	U	48.1	49.8		ug/Kg	☼	104	80 - 120	3	20
Ethylbenzene	0.79	U	48.1	46.9		ug/Kg	☼	98	80 - 120	9	20
Methylene Chloride	1.8	U	48.1	53.0		ug/Kg	☼	110	77 - 123	6	20
Styrene	2.2	U	48.1	53.7		ug/Kg	☼	112	80 - 120	7	20
Tetrachloroethene	0.64	U	48.1	47.3		ug/Kg	☼	98	80 - 120	10	20
Toluene	2.9	U	48.1	53.4		ug/Kg	☼	111	80 - 124	8	20
trans-1,3-Dichloropropene	2.0	U	48.1	51.0		ug/Kg	☼	106	80 - 122	6	20
Trichloroethene	0.45	U	48.1	53.2		ug/Kg	☼	111	79 - 120	6	20
Vinyl chloride	0.49	U	48.1	38.9		ug/Kg	☼	81	71 - 120	8	20
Xylenes, Total	0.97	U	96.2	106		ug/Kg	☼	110	80 - 120	9	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32122-1	B3L1W7	90	102	94	99
160-32122-2	B3L1X3	91	98	95	99
160-32122-2 MS	B3L1X3	85	98	94	99
160-32122-2 MSD	B3L1X3	87	99	95	99
160-32122-3	B3L222	89	93	92	97
160-32122-4	B3L1X9	91	100	95	99
160-32122-5	B3L1X6	90	109	97	100
160-32122-6	B3L229	94	95	99	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406161/5	Lab Control Sample	86	96	96	99
LCSD 160-406161/6	Lab Control Sample Dup	84	96	98	100
MB 160-406161/8	Method Blank	87	96	98	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32122-1 - DL	B3L1W7	0 X	0 X	0 X	0 X	0 X	0 X
160-32122-2 - DL	B3L1X3	0 X	0 X	0 X	0 X	0 X	0 X
160-32122-3 - DL	B3L222	55	70	61	48	61	77
160-32122-4 - DL	B3L1X9	64	85	79	60	75	86
160-32122-5 - DL	B3L1X6	74	76	71	58	69	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-406289/8
Matrix: Solid
Analysis Batch: 406289

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/18/18 11:49	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/18/18 11:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/18/18 11:49	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/18/18 11:49	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/18/18 11:49	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/18/18 11:49	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/18/18 11:49	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/18/18 11:49	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/18/18 11:49	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/18/18 11:49	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/18/18 11:49	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/18/18 11:49	1
Acetone	6.5	U	20	6.5	ug/Kg			12/18/18 11:49	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/18/18 11:49	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/18/18 11:49	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/18/18 11:49	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/18/18 11:49	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/18/18 11:49	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/18/18 11:49	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/18/18 11:49	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/18/18 11:49	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/18/18 11:49	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/18/18 11:49	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/18/18 11:49	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/18/18 11:49	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/18/18 11:49	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/18/18 11:49	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/18/18 11:49	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/18/18 11:49	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/18/18 11:49	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/18/18 11:49	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/18/18 11:49	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/18/18 11:49	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/18/18 11:49	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/18/18 11:49*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*67 - 132*		*12/18/18 11:49*	*1*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*		*12/18/18 11:49*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/18/18 11:49*	*1*
Toluene-d8 (Surr)	*105*		*74 - 135*		*12/18/18 11:49*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406289/5
Matrix: Solid
Analysis Batch: 406289

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	45.7		ug/Kg		91	71 - 127
1,1,2,2-Tetrachloroethane	50.0	52.4		ug/Kg		105	52 - 140
1,1,2-Trichloroethane	50.0	52.7		ug/Kg		105	79 - 122
1,1-Dichloroethane	50.0	49.1		ug/Kg		98	80 - 120
1,1-Dichloroethene	50.0	51.8		ug/Kg		104	71 - 126
1,2-Dichloroethane	50.0	44.5		ug/Kg		89	68 - 128
1,2-Dichloroethene, Total	100	108		ug/Kg		108	79 - 121
1,2-Dichloropropane	50.0	53.9		ug/Kg		108	80 - 126
2-Butanone (MEK)	50.0	49.0		ug/Kg		98	41 - 140
2-Hexanone	50.0	47.7		ug/Kg		95	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	45.4		ug/Kg		91	67 - 130
Acetone	50.0	39.9		ug/Kg		80	39 - 140
Benzene	50.0	50.4		ug/Kg		101	80 - 120
Bromodichloromethane	50.0	48.8		ug/Kg		98	78 - 124
Bromoform	50.0	51.1		ug/Kg		102	67 - 135
Bromomethane	50.0	39.0		ug/Kg		78	61 - 132
Carbon disulfide	50.0	48.8		ug/Kg		98	74 - 124
Carbon tetrachloride	50.0	45.8		ug/Kg		92	68 - 130
Chlorobenzene	50.0	51.4		ug/Kg		103	80 - 120
Chloroethane	50.0	31.1	o	ug/Kg		62	73 - 129
Chloroform	50.0	45.6		ug/Kg		91	78 - 120
Chloromethane	50.0	43.3		ug/Kg		87	69 - 123
cis-1,3-Dichloropropene	50.0	57.0		ug/Kg		114	78 - 127
Dibromochloromethane	50.0	51.9		ug/Kg		104	77 - 126
Ethylbenzene	50.0	50.0		ug/Kg		100	79 - 126
Methylene Chloride	50.0	52.5		ug/Kg		105	76 - 120
Styrene	50.0	56.9		ug/Kg		114	80 - 129
Tetrachloroethene	50.0	49.8		ug/Kg		100	76 - 126
Toluene	50.0	55.8		ug/Kg		112	76 - 136
trans-1,3-Dichloropropene	50.0	53.6		ug/Kg		107	77 - 136
Trichloroethene	50.0	48.5		ug/Kg		97	66 - 130
Vinyl chloride	50.0	38.1		ug/Kg		76	56 - 134
Xylenes, Total	100	112		ug/Kg		112	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: LCSD 160-406289/6
Matrix: Solid
Analysis Batch: 406289

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	47.1		ug/Kg		94	71 - 127	3	20
1,1,2,2-Tetrachloroethane	50.0	54.0		ug/Kg		108	52 - 140	3	20
1,1,2-Trichloroethane	50.0	52.6		ug/Kg		105	79 - 122	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406289/6
Matrix: Solid
Analysis Batch: 406289

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	48.3		ug/Kg		97	80 - 120	2	20
1,1-Dichloroethene	50.0	51.1		ug/Kg		102	71 - 126	1	20
1,2-Dichloroethane	50.0	43.8		ug/Kg		88	68 - 128	2	20
1,2-Dichloroethene, Total	100	109		ug/Kg		109	79 - 121	0	20
1,2-Dichloropropane	50.0	53.2		ug/Kg		106	80 - 126	1	20
2-Butanone (MEK)	50.0	45.9		ug/Kg		92	41 - 140	7	20
2-Hexanone	50.0	46.4		ug/Kg		93	63 - 136	3	20
4-Methyl-2-pentanone (MIBK)	50.0	43.4		ug/Kg		87	67 - 130	5	20
Acetone	50.0	38.9		ug/Kg		78	39 - 140	2	20
Benzene	50.0	50.4		ug/Kg		101	80 - 120	0	20
Bromodichloromethane	50.0	49.0		ug/Kg		98	78 - 124	0	20
Bromoform	50.0	50.3		ug/Kg		101	67 - 135	2	20
Bromomethane	50.0	39.9		ug/Kg		80	61 - 132	2	20
Carbon disulfide	50.0	49.9		ug/Kg		100	74 - 124	2	20
Carbon tetrachloride	50.0	45.4		ug/Kg		91	68 - 130	1	20
Chlorobenzene	50.0	51.4		ug/Kg		103	80 - 120	0	20
Chloroethane	50.0	32.6	o	ug/Kg		65	73 - 129	5	20
Chloroform	50.0	46.2		ug/Kg		92	78 - 120	1	20
Chloromethane	50.0	42.2		ug/Kg		84	69 - 123	2	20
cis-1,3-Dichloropropene	50.0	56.8		ug/Kg		114	78 - 127	0	20
Dibromochloromethane	50.0	50.7		ug/Kg		101	77 - 126	2	20
Ethylbenzene	50.0	50.1		ug/Kg		100	79 - 126	0	20
Methylene Chloride	50.0	52.3		ug/Kg		105	76 - 120	0	20
Styrene	50.0	57.8		ug/Kg		116	80 - 129	2	20
Tetrachloroethene	50.0	52.7		ug/Kg		105	76 - 126	6	20
Toluene	50.0	55.2		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	52.5		ug/Kg		105	77 - 136	2	20
Trichloroethene	50.0	49.0		ug/Kg		98	66 - 130	1	20
Vinyl chloride	50.0	38.8		ug/Kg		78	56 - 134	2	20
Xylenes, Total	100	114		ug/Kg		114	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*97*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32143-12 MS
Matrix: Soil
Analysis Batch: 406289

Client Sample ID: B3L210
Prep Type: Total/NA
Prep Batch: 406397

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.35	U	58.4	53.0		ug/Kg	☼	91	80 - 120
1,1,2,2-Tetrachloroethane	1.6	U T	58.4	44.8	T	ug/Kg	☼	77	78 - 120
1,1,2-Trichloroethane	0.97	U	58.4	62.3		ug/Kg	☼	107	80 - 120
1,1-Dichloroethane	0.32	U	58.4	56.3		ug/Kg	☼	96	80 - 120
1,1-Dichloroethene	1.3	U	58.4	60.2		ug/Kg	☼	103	78 - 121
1,2-Dichloroethane	0.71	U	58.4	49.8		ug/Kg	☼	85	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32143-12 MS
Matrix: Soil
Analysis Batch: 406289

Client Sample ID: B3L210
Prep Type: Total/NA
Prep Batch: 406397

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.1	U	117	127		ug/Kg	☼	108	80 - 120
1,2-Dichloropropane	0.50	U	58.4	62.3		ug/Kg	☼	107	80 - 120
2-Butanone (MEK)	1.6	U	58.4	47.1		ug/Kg	☼	81	69 - 124
2-Hexanone	2.8	U T	58.4	33.1	T	ug/Kg	☼	57	62 - 118
4-Methyl-2-pentanone (MIBK)	2.1	U	58.4	43.9		ug/Kg	☼	75	73 - 125
Acetone	7.5	J T	58.4	158	T	ug/Kg	☼	259	54 - 139
Benzene	0.21	U	58.4	59.8		ug/Kg	☼	102	80 - 120
Bromodichloromethane	0.41	U	58.4	54.5		ug/Kg	☼	93	80 - 120
Bromoform	1.6	U	58.4	63.6		ug/Kg	☼	109	80 - 125
Bromomethane	1.9	U	58.4	43.2		ug/Kg	☼	74	70 - 126
Carbon disulfide	0.57	U	58.4	55.2		ug/Kg	☼	95	79 - 121
Carbon tetrachloride	0.42	U	58.4	50.4		ug/Kg	☼	86	80 - 120
Chlorobenzene	0.67	U	58.4	59.5		ug/Kg	☼	102	80 - 120
Chloroethane	1.6	U o	58.4	38.9		ug/Kg	☼	67	64 - 133
Chloroform	0.31	U	58.4	54.0		ug/Kg	☼	92	80 - 120
Chloromethane	0.53	U	58.4	49.0		ug/Kg	☼	84	75 - 120
cis-1,3-Dichloropropene	1.7	U	58.4	59.8		ug/Kg	☼	103	80 - 120
Dibromochloromethane	1.0	U	58.4	61.3		ug/Kg	☼	105	80 - 120
Ethylbenzene	0.57	U	58.4	56.5		ug/Kg	☼	97	80 - 120
Methylene Chloride	1.6	J	58.4	63.8		ug/Kg	☼	107	77 - 123
Styrene	1.6	U	58.4	64.6		ug/Kg	☼	111	80 - 120
Tetrachloroethene	0.46	U	58.4	56.7		ug/Kg	☼	97	80 - 120
Toluene	2.1	U	58.4	66.5		ug/Kg	☼	114	80 - 124
trans-1,3-Dichloropropene	1.4	U	58.4	58.4		ug/Kg	☼	100	80 - 122
Trichloroethene	0.32	U	58.4	70.0		ug/Kg	☼	120	79 - 120
Vinyl chloride	0.35	U	58.4	45.2		ug/Kg	☼	77	71 - 120
Xylenes, Total	0.70	U	117	128		ug/Kg	☼	109	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*107*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*107*		*74 - 135*

Lab Sample ID: 160-32143-12 MSD
Matrix: Soil
Analysis Batch: 406289

Client Sample ID: B3L210
Prep Type: Total/NA
Prep Batch: 406397

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.35	U	58.0	52.1		ug/Kg	☼	90	80 - 120	2	20
1,1,2,2-Tetrachloroethane	1.6	U T	58.0	48.1		ug/Kg	☼	83	78 - 120	7	20
1,1,2-Trichloroethane	0.97	U	58.0	63.7		ug/Kg	☼	110	80 - 120	2	20
1,1-Dichloroethane	0.32	U	58.0	57.0		ug/Kg	☼	98	80 - 120	1	20
1,1-Dichloroethene	1.3	U	58.0	58.4		ug/Kg	☼	101	78 - 121	3	20
1,2-Dichloroethane	0.71	U	58.0	49.6		ug/Kg	☼	86	78 - 117	0	20
1,2-Dichloroethene, Total	1.1	U	116	126		ug/Kg	☼	109	80 - 120	0	20
1,2-Dichloropropane	0.50	U	58.0	62.2		ug/Kg	☼	107	80 - 120	0	20
2-Butanone (MEK)	1.6	U	58.0	43.5		ug/Kg	☼	75	69 - 124	8	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32143-12 MSD
Matrix: Soil
Analysis Batch: 406289

Client Sample ID: B3L210
Prep Type: Total/NA
Prep Batch: 406397

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	2.8	U T	58.0	30.8	T	ug/Kg	☼	53	62 - 118	7	20
4-Methyl-2-pentanone (MIBK)	2.1	U	58.0	43.9		ug/Kg	☼	76	73 - 125	0	20
Acetone	7.5	J T	58.0	175	T	ug/Kg	☼	289	54 - 139	10	20
Benzene	0.21	U	58.0	59.6		ug/Kg	☼	103	80 - 120	0	20
Bromodichloromethane	0.41	U	58.0	56.0		ug/Kg	☼	97	80 - 120	3	20
Bromoform	1.6	U	58.0	66.6		ug/Kg	☼	115	80 - 125	5	20
Bromomethane	1.9	U	58.0	43.1		ug/Kg	☼	74	70 - 126	0	20
Carbon disulfide	0.57	U	58.0	53.1		ug/Kg	☼	92	79 - 121	4	20
Carbon tetrachloride	0.42	U	58.0	48.8		ug/Kg	☼	84	80 - 120	3	20
Chlorobenzene	0.67	U	58.0	59.5		ug/Kg	☼	103	80 - 120	0	20
Chloroethane	1.6	U o	58.0	39.3		ug/Kg	☼	68	64 - 133	1	20
Chloroform	0.31	U	58.0	53.6		ug/Kg	☼	92	80 - 120	1	20
Chloromethane	0.53	U	58.0	48.1		ug/Kg	☼	83	75 - 120	2	20
cis-1,3-Dichloropropene	1.7	U	58.0	58.9		ug/Kg	☼	102	80 - 120	2	20
Dibromochloromethane	1.0	U	58.0	60.4		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.57	U	58.0	54.5		ug/Kg	☼	94	80 - 120	4	20
Methylene Chloride	1.6	J	58.0	64.2		ug/Kg	☼	108	77 - 123	1	20
Styrene	1.6	U	58.0	61.7		ug/Kg	☼	106	80 - 120	5	20
Tetrachloroethene	0.46	U	58.0	52.9		ug/Kg	☼	91	80 - 120	7	20
Toluene	2.1	U	58.0	65.6		ug/Kg	☼	113	80 - 124	1	20
trans-1,3-Dichloropropene	1.4	U	58.0	58.3		ug/Kg	☼	101	80 - 122	0	20
Trichloroethene	0.32	U	58.0	67.5		ug/Kg	☼	116	79 - 120	4	20
Vinyl chloride	0.35	U	58.0	44.6		ug/Kg	☼	77	71 - 120	1	20
Xylenes, Total	0.70	U	116	123		ug/Kg	☼	106	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*67 - 132*
4-Bromofluorobenzene (Surr)	*113*		*59 - 150*
Dibromofluoromethane (Surr)	*94*		*53 - 143*
Toluene-d8 (Surr)	*109*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404663/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404663

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 13:58	12/13/18 18:27	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32143-1
SDG: SL32143-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32143-2	B3L230	108	109	117	115
160-32143-3	B3L207	95	115	104	108
160-32143-4	B3L1X0	95	104	101	106
160-32143-5	B3L1Y2	99	116	102	109
160-32143-6	B3L213	94	105	100	105
160-32143-7	B3L219	95	101	102	103
160-32143-8	B3L1V8	98	106	101	108
160-32143-9	B3L1V2	97	109	103	108
160-32143-10	B3L1Y5	99	107	105	107
160-32143-11	B3L225	100	109	102	106
160-32143-12	B3L210	99	106	103	105
160-32143-12 MS	B3L210	86	107	93	107
160-32143-12 MSD	B3L210	88	113	94	109
160-32143-13	B3L1Y8	99	109	99	107
160-32143-14	B3L216	98	108	101	107
160-32143-15	B3L1W4	97	108	105	110
160-32143-16	B3L201	113	131	122	128
160-32143-17	B3L204	101	121	102	112
160-32143-18	B3L1W1	102	107	106	109
160-32143-19	B3L1V5	104	112	103	106
160-32143-20	B3L1T9	102	109	106	110

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406289/5	Lab Control Sample	90	100	98	105
LCSD 160-406289/6	Lab Control Sample Dup	88	98	97	104
MB 160-406289/8	Method Blank	91	101	102	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Date: 29 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL32122-1, SL32143-1, GEL466073, GEL466240, GEL466294

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32122-1 and SL32143-1 prepared by TestAmerica Laboratories Inc and SDGs GEL466073, GEL466240 and GEL466294 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1W7	12/03/18	Soil	C	8270D
B3L1X3	12/03/18	Soil	C	8270D
B3L222	12/03/18	Soil	C	8270D
B3L1X9	12/03/18	Soil	C	8270D
B3L1X6	12/03/18	Soil	C	8270D
B3L207	12/04/18	Soil	C	8270D
B3L1X0	12/04/18	Soil	C	8270D
B3L1Y2	12/04/18	Soil	C	8270D
B3L213	12/04/18	Soil	C	8270D
B3L219	12/04/18	Soil	C	8270D
B3L1V8	12/04/18	Soil	C	8270D
B3L1V2	12/04/18	Soil	C	8270D
B3L1Y5	12/04/18	Soil	C	8270D
B3L225	12/04/18	Soil	C	8270D
B3L210	12/04/18	Soil	C	8270D
B3L1Y8	12/04/18	Soil	C	8270D
B3L216	12/04/18	Soil	C	8270D
B3L1W4	12/04/18	Soil	C	8270D
B3L201	12/04/18	Soil	C	8270D
B3L204	12/04/18	Soil	C	8270D
B3L1W1	12/04/18	Soil	C	8270D
B3L1V5	12/04/18	Soil	C	8270D
B3L1T9	12/04/18	Soil	C	8270D
B3MN43	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MN45	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MN46	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MN47	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MN58	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MN52	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN50	12/04/18	Soil	C	WTPH-D, WTPH-G

B3MN40	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN59	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN41	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN55	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN57	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN38	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN42	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN53	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN54	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN48	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN37	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN56	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN44	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN51	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN49	12/04/18	Soil	C	WTPH-D, WTPH-G
B3MN39	12/04/18	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for WTPH-G requires analysis within 14 days of sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG GEL466294, the samples were analyzed beyond but within 2X the holding time for WTPH-G. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

SDG SL32122-1
The 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for sample B3L1X9 and the nitrobenzene-d5 and phenol-d5 surrogate recoveries for sample B3L1X6 were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and other associated surrogate recoveries were within the acceptance limit; therefore data should not be qualified.

The 2,4,6-tribromophenol, nitrobenzene-d5 and phenol-d5 surrogate recoveries for the MB were below the lower acceptance limit but ≥20%. Since the sample was a QC sample data should not be qualified as a result.

The 2,4,6-tribromophenol, 2-fluorophenol, nitrobenzene-d5 and phenol-d5 surrogate recoveries for sample B3L222 were below the lower acceptance limit but ≥20%. The sample was analyzed at a dilution and based on professional judgment data should not be qualified as a result.

All surrogate recoveries for samples B3L1W7 and B3L1X3 were <20%. The samples were analyzed at dilutions and based on professional judgment data should not be qualified as a result.

SDG SL32143-1
The nitrobenzene-d5 surrogate recoveries for samples B3L213, B3L219, B3L1V8, B3L216, B3L1W4, B3L1W1 and B3L1V5 were below the lower acceptance limit but ≥20%. In addition the 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for samples B3L207MS. B3L207MSD, B3L1Y2, B3L1V2, B3L210, B3L201 and B3L1T9 were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and all other associated surrogate recoveries were within the acceptance limit; therefore data should not be qualified. Since samples B3L207MS and B3L207MSD were QC samples, data should not be qualified as a result.

The 2,4,6-tribromophenol, nitrobenzene-d5 and pheno1-d5 surrogate recoveries for samples B3L207, B3L225 and the MB were below the lower acceptance limit but ≥20%. Samples B3L207 and B3L225 were analyzed at dilutions and based on professional judgment data should not be qualified as a result. Since the MB is a QC sample, data should not be qualified as a result.

All surrogate recoveries for samples B3L1X0, B3L1Y5, B3L1Y8 and B3L204 were <20%. The samples were analyzed at dilutions and based on professional judgment; data should not be qualified as a result.

For SDG GEL466073, the bromofluorobenzene surrogate recovery for sample B3MN46MSD was below the lower acceptance limit but ≥ 10%. Since the sample was a QC sample, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the MS and/or MSD recoveries for 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether and isophorone were below the lower acceptance limit but ≥20%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged “UJ”. See the table in Appendix 2 for a listing of affected samples.

For SDG SL32143-1, the MS and/or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dinitrobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 2,6-dinitrotoluene, 2-methylphenol, 2-nitrophenol, 3,3'-dichlorobenzidine, 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-bromophenyl phenyl ether, 4-chloroaniline, anthracene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, fluoranthene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, isophorone, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol and phenol were below the lower acceptance limit but ≥20%. All associated sample results should be qualified as estimates and flagged “UJ” for non-detects and flagged “J” for detects. See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466073, the MSD recovery for WTPH-G was below the lower acceptance limit but ≥ 20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466240, the MS recovery for WTPH-G was below the lower acceptance limit but ≥ 20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466294, the MSD recovery for WTPH-G was below the lower acceptance limit but ≥ 20%. All associated sample results were non-detects and would be qualified as estimates and flagged UJ but were further qualified as unusable and flagged "UR" due to missed holding time. See the table in Appendix 2 for a listing of affected samples.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the LCS recoveries for 3,3′-dichorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachloroethane. isophorone and phenol were below the lower acceptance limit but ≥ 40%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected sample.

For SDG SL32143-1, the LCS recoveries for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 2,4-dinitrophenol, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD difference values were acceptable.

Field Duplicate Samples

All field duplicates results were acceptable

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

CRDLs for WTPH-D and WTPH-G were met.

- **Completeness**

SDGs SL32122-1, SL32143-1, GEL466073, GEL466240 and GEL466294 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage for methods 8270D and WTPH-D was 100%. The completion percentage for WTPH-G was 56%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of WTPH-G sample results as unusable were due to samples analyzed beyond but within 2X the holding time. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike and low LCS recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL32122-1, SL32143-1, GEL466073, GEL466240, GEL466294	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4-dinitrophenol	UJ	B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6	Low matrix spike recoveries
3,3′-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, isophorone	UJ	B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6	Low matrix spike and LCS recovery
hexachloroethane, phenol	UJ	B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6	Low LCS recovery
1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 2,6-dinitrotoluene, 2-methylphenol, 2-nitrophenol, 3,3'-dichlorobenzidine, 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-bromophenyl phenyl ether, anthracene, bis(2-chloroethoxy)methane, hexachlorobutadiene, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol phenol	UJ	B3L219, B3L216, B3L207, B3L1X0, B3L1Y2, B3L213, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9	Low matrix spike recoveries
fluoranthene	J	B3L207	Low matrix spike recoveries
fluoranthene	UJ	B3L219, B3L216, B3L1X0, B3L1Y2, B3L213, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L1W4,	Low matrix spike recoveries

		B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9,	
1,2-dichlorobenzene, 1,3-dichlorobenzene, 2,4-dinitrophenol, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane, isophorone	UJ	B3L219, B3L216, B3L207, B3L1X0, B3L1Y2, B3L213, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9	Low matrix spike recoveries and low LCS recovery
WTPH-G	UR	B3MN42, B3MN53, B3MN54, B3MN48, B3MN37, B3MN56, B3MN44, B3MN51, B3MN49, B3MN39	Analyzed beyond but within 2X the holding time and low matrix spike recovery
WTPH-G	UJ	B3MN43, B3MN45, B3MN46, B3MN47, B3MN58, B3MN52, B3MN50, B3MN40, B3MN59, B3MN41, B3MN55, B3MN57, B3MN38	Low matrix spike recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/29/19	
			SDG: SL32122-1, SL32143-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SL32122-1: B3L1W7, B3L1X3, B3L222, B3L1X9, B3L1X6					
SL32143-1: B3L207, B3L1X0, B3L1Y2, B3L213, B3L219, B3L1V8, B3L1V2, B3L1Y5, B3L225, B3L210, B3L1Y8, B3L216, B3L1W4, B3L201, B3L204, B3L1W1, B3L1V5, B3L1T9					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SL32122-1; Samples B3L1W7 and B3L1X3 all surrogate 0%; B3L222 TBP 55%, 2FP 61%, NBZ 48%, PHL 61%, B3L1X9 TBP 64%, NBZ 60%; B3L1X6 NBZ 68%, PHL 69%; MB TBP 61%, NBZ 60%, PHL 64%

SL32143-1: Samples B3L1X0, B3L1Y5, B3L1Y8, B3L204 all surrogate 0%; B3L207 TBP 68%, NBZ 58%, PHL 69%, B3L207MS TBP 69%, NBZ 66%; B3L207MSD TBP 61%, NBZ 68%; B3L1Y2 TBP 67%, NBZ 59%; B3L213 NBZ 66%, B3L219 NBZ 60%, B3L1V8 NBZ 58%; B3L1V2 TBP 69%, NBZ 65%; B3L225 TBP 67%, NBZ 58%, PHL 66%; B3L210 TBP 69%, NBZ 68%, B3L216 NBZ 65%; B3L1W4 NBZ 62%; B3L201 TBP 64%, NBZ 63%; B3L1W1 NBZ 62%; B3L1V5 NBZ 64%; B3L1T9 TBP 66%, NBZ 60%; MB TBP 65%, NBZ 63%, PHL 69%

See last page for MS/MSD and LCS information

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD RPD values acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No (N/A)
Internal standard areas acceptable?	Yes No (N/A)
Internal standard retention times acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

MS/MSD

SL32122-1: 2,4-dinitrophenol 67% (MS); 3,3'-dichlorobenzidine 69% (MSD); 4-chloroaniline 62%/66%; bis(2 chloro-1-methylethyl)ether 68% (MSD); bis(2-chloroethyl)ether 65%/66%; isophorone 68%/69%

SL32143-1: 1,2,4-trichlorobenzene 62%/69%; 1,2-dichlorobenzene 68%/67%; 1,3-dichlorobenzene 67%/65%; 1,4-dichlorobenzene 67%/67%, 2,4-dinitrophenol 62%/61%; 2,6-dinitrotoluene 64% (MSD); 2-methylphenol 68% (MSD); 2-nitrophenol 69%/69%; 3,3'-dichlorobenzidiene 60%/60%; 3-nitroaniline 63% (MSD); 4,6-dinitro-2-methylphenol 66% (MSD); 4-bromophenyl phenyl ether 65%; 4-chloroaniline 57%/55%; anthracene 68% (MSD); bis(2 chloro-1-methylethyl)ether 68%/62%; bis(2-chloroethoxy)methane 68% (MS); bis(2-chloroethyl)ether 67%/61%; fluoranthene 68% (MSD); hexachlorobutadiene 66% (MS); hexachlorocyclopentadiene 52%/56%; hexachloroethane 61% (MSD); isophorone 63%/58%; naphthalene 68% (MS); nitrobenzene 67%/69%; n-nitrosodi-n-propylamine 65%; pentachlorophenol 66%/64%; phenol 67%

LCS

SL32122-1: 3,3'-dichlorobenzidine 67%; 4-chloroaniline 59%; bis(2 chloro-1-methylethyl)ether 65%; bis(2-chloroethyl)ether 61%; hexachloroethane 68%; phenol 69%; isophorone 65%

SL32143-1: 1,2-dichlorobenzene 68%; 1,3-dichlorobenzene 66%; 2,4-dinitrophenol 60%; 4-chloroaniline 64%; bis(2 chloro-1-methylethyl)ether 65%; bis(2-chloroethyl)ether 63%; hexachlorocyclopentadiene 69%; hexachloroethane 68%; isophorone 67%

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/28/19	
			SDG: GEL466073, GEL466240, GEL466294		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	

SAMPLES/MATRIX: Soil

GEL466073: B3MN43, B3MN45, B3MN46, B3MN47, B3MN58

GEL466240: B3MN52, B3MN50, B3MN40, B3MN59, B3MN41, B3MN55, B3MN57, B3MN38

GEL466294: B3MN42, B3MN53, B3MN54, B3MN48, B3MN37, B3MN56, B3MN44, B3MN51, B3MN49, B3MN39

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

GEL466073: BFB B3MN46MSD 57%,

MS/MSD

GEL466073: GRO 68% (MSD)

GEL466240: GRO 64% (MS)

GEL466294: GRO 54% (MSD)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

GEL466294: GRO samples analyzed 20 days after collection

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32122-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3L1X3
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.8	U	48.1	39.6		ug/Kg	☼	82	62 - 118	0	20
4-Methyl-2-pentanone (MIBK)	2.9	U	48.1	40.7		ug/Kg	☼	85	73 - 125	3	20
Acetone	7.4	U	48.1	57.1		ug/Kg	☼	119	54 - 139	6	20
Benzene	0.29	U	48.1	49.9		ug/Kg	☼	104	80 - 120	9	20
Bromodichloromethane	0.57	U	48.1	48.0		ug/Kg	☼	100	80 - 120	8	20
Bromoform	2.2	U	48.1	49.6		ug/Kg	☼	103	80 - 125	5	20
Bromomethane	2.7	U	48.1	40.5		ug/Kg	☼	84	70 - 126	9	20
Carbon disulfide	0.79	U	48.1	51.6		ug/Kg	☼	107	79 - 121	8	20
Carbon tetrachloride	0.58	U	48.1	45.5		ug/Kg	☼	95	80 - 120	7	20
Chlorobenzene	0.93	U	48.1	48.9		ug/Kg	☼	102	80 - 120	7	20
Chloroethane	2.2	U o	48.1	33.1		ug/Kg	☼	69	64 - 133	9	20
Chloroform	0.43	U	48.1	45.9		ug/Kg	☼	95	80 - 120	7	20
Chloromethane	0.74	U	48.1	43.4		ug/Kg	☼	90	75 - 120	7	20
cis-1,3-Dichloropropene	2.4	U	48.1	55.3		ug/Kg	☼	115	80 - 120	6	20
Dibromochloromethane	1.4	U	48.1	49.8		ug/Kg	☼	104	80 - 120	3	20
Ethylbenzene	0.79	U	48.1	46.9		ug/Kg	☼	98	80 - 120	9	20
Methylene Chloride	1.8	U	48.1	53.0		ug/Kg	☼	110	77 - 123	6	20
Styrene	2.2	U	48.1	53.7		ug/Kg	☼	112	80 - 120	7	20
Tetrachloroethene	0.64	U	48.1	47.3		ug/Kg	☼	98	80 - 120	10	20
Toluene	2.9	U	48.1	53.4		ug/Kg	☼	111	80 - 124	8	20
trans-1,3-Dichloropropene	2.0	U	48.1	51.0		ug/Kg	☼	106	80 - 122	6	20
Trichloroethene	0.45	U	48.1	53.2		ug/Kg	☼	111	79 - 120	6	20
Vinyl chloride	0.49	U	48.1	38.9		ug/Kg	☼	81	71 - 120	8	20
Xylenes, Total	0.97	U	96.2	106		ug/Kg	☼	110	80 - 120	9	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Methylphenol	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Picoline	45	U	660	45	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acenaphthene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acenaphthylene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acetophenone	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Aniline	60	U	330	60	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Anthracene	49	U	330	49	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Aramite	330	U	660	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Carbazole	47	U	330	47	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Chrysene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diallate	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dibenzofuran	41	U	330	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diethylphthalate	82	U	330	82	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dimethoate	100	U	660	100	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dinoseb	330	U	660	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Disulfoton	41	U	1600	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Famphur	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Fluoranthene	50	U	330	50	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Fluorene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachloroethane	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isodrin	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isophorone	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isosafrole	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Kepone	330	U	3300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methapyrilene	140	U	1600	140	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methyl parathion	120	U	1600	120	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Naphthalene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Nitrobenzene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Parathion	98	U	1600	98	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenacetin	54	U	660	54	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenanthrene	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenol	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phorate	37	U	1600	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pronamide	53	U	660	53	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pyrene	73	U	330	73	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pyridine	71	U	660	71	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Safrole	33	U	660	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*12/07/18 11:05*	*12/13/18 10:45*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*61*		*47 - 125*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
2-Fluorobiphenyl (Surr)	*74*		*59 - 110*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
2-Fluorophenol (Surr)	*71*		*54 - 102*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Nitrobenzene-d5 (Surr)	*60*		*44 - 120*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Phenol-d5 (Surr)	*64*		*51 - 104*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Terphenyl-d14 (Surr)	*79*		*59 - 98*	*12/07/18 11:05*	*12/13/18 10:45*	*1*

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2470		ug/Kg		74	58 - 101
1,2-Dichlorobenzene	3330	2330		ug/Kg		70	57 - 99
1,3-Dichlorobenzene	3330	2370		ug/Kg		71	55 - 98
1,4-Dichlorobenzene	3330	2330		ug/Kg		70	56 - 98
2,4,5-Trichlorophenol	3330	2740		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2830		ug/Kg		85	56 - 110
2,4-Dichlorophenol	3330	2750		ug/Kg		83	57 - 99
2,4-Dimethylphenol	3330	2570		ug/Kg		77	53 - 97
2,4-Dinitrophenol	3330	2580		ug/Kg		77	10 - 89
2,4-Dinitrotoluene	3330	2770		ug/Kg		83	54 - 105
2,6-Dinitrotoluene	3330	2660		ug/Kg		80	55 - 105

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloronaphthalene	3330	2750		ug/Kg		83	56 - 111
2-Chlorophenol	3330	2520		ug/Kg		76	56 - 99
2-Methylnaphthalene	3330	2630		ug/Kg		79	58 - 98
2-Methylphenol	3330	2490		ug/Kg		75	53 - 97
2-Nitroaniline	3330	2500		ug/Kg		75	55 - 108
2-Nitrophenol	3330	2620		ug/Kg		79	59 - 104
3 & 4 Methylphenol	3330	2830		ug/Kg		85	58 - 108
3,3'-Dichlorobenzidine	3330	2230		ug/Kg		67	42 - 104
3-Nitroaniline	3330	2370		ug/Kg		71	43 - 96
4,6-Dinitro-2-methylphenol	3330	3010		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2630		ug/Kg		79	54 - 98
4-Chloroaniline	3330	1960		ug/Kg		59	41 - 83
4-Chlorophenyl phenyl ether	3330	2820		ug/Kg		84	55 - 105
4-Nitroaniline	3330	2660		ug/Kg		80	49 - 99
4-Nitrophenol	3330	2650		ug/Kg		79	48 - 106
Acenaphthene	3330	2730		ug/Kg		82	55 - 106
Acenaphthylene	3330	2720		ug/Kg		82	56 - 109
Anthracene	3330	2840		ug/Kg		85	56 - 103
Benzo[a]anthracene	3330	2870		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2720		ug/Kg		82	57 - 109
Benzo[b]fluoranthene	3330	2690		ug/Kg		81	68 - 109
Benzo[g,h,i]perylene	3330	3360		ug/Kg		101	51 - 126
Benzo[k]fluoranthene	3330	2570		ug/Kg		77	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2160		ug/Kg		65	49 - 94
Bis(2-chloroethoxy)methane	3330	2410		ug/Kg		72	56 - 99
Bis(2-chloroethyl)ether	3330	2020		ug/Kg		61	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2940		ug/Kg		88	59 - 113
Butyl benzyl phthalate	3330	2920		ug/Kg		88	60 - 112
Carbazole	3330	2810		ug/Kg		84	53 - 98
Chrysene	3330	2870		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	3590		ug/Kg		108	52 - 126
Dibenzofuran	3330	2740		ug/Kg		82	55 - 103
Diethylphthalate	3330	2810		ug/Kg		84	54 - 101
Di-n-butyl phthalate	3330	2780		ug/Kg		83	57 - 102
Di-n-octyl phthalate	3330	3040		ug/Kg		91	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3370		ug/Kg		101	63 - 121
Fluoranthene	3330	2730		ug/Kg		82	54 - 100
Fluorene	3330	2780		ug/Kg		83	57 - 106
Hexachlorobenzene	3330	2860		ug/Kg		86	57 - 109
Hexachlorobutadiene	3330	2600		ug/Kg		78	59 - 106
Hexachlorocyclopentadiene	3330	2550		ug/Kg		77	44 - 140
Hexachloroethane	3330	2270		ug/Kg		68	56 - 102
Indeno[1,2,3-cd]pyrene	3330	3620		ug/Kg		109	52 - 132
Isophorone	3330	2170		ug/Kg		65	55 - 96
Naphthalene	3330	2520		ug/Kg		76	57 - 98
Nitrobenzene	3330	2430		ug/Kg		73	58 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-Nitrosodi-n-propylamine	3330	2320		ug/Kg		70	54 - 98
Pentachlorophenol	3330	2650		ug/Kg		80	35 - 107
Phenanthrene	3330	2840		ug/Kg		85	57 - 103
Phenol	3330	2320		ug/Kg		69	50 - 96
Pyrene	3330	3020		ug/Kg		91	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Lab Sample ID: 160-32124-A-1-B MS
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3580	2710		ug/Kg	☼	76	52 - 103
1,2-Dichlorobenzene	38	U	3580	2630		ug/Kg	☼	73	50 - 98
1,3-Dichlorobenzene	39	U	3580	2510		ug/Kg	☼	70	49 - 96
1,4-Dichlorobenzene	40	U	3580	2640		ug/Kg	☼	74	50 - 96
2,4,5-Trichlorophenol	56	U	3580	2880		ug/Kg	☼	80	41 - 116
2,4,6-Trichlorophenol	49	U	3580	2970		ug/Kg	☼	83	40 - 115
2,4-Dichlorophenol	42	U	3580	2990		ug/Kg	☼	84	47 - 104
2,4-Dimethylphenol	59	U	3580	2890		ug/Kg	☼	81	45 - 105
2,4-Dinitrophenol	350	U	3580	2400		ug/Kg	☼	67	10 - 100
2,4-Dinitrotoluene	140	U	3580	2980		ug/Kg	☼	83	42 - 113
2,6-Dinitrotoluene	67	U	3580	2990		ug/Kg	☼	83	46 - 109
2-Chloronaphthalene	40	U	3580	2970		ug/Kg	☼	83	52 - 108
2-Chlorophenol	41	U	3580	2860		ug/Kg	☼	80	48 - 102
2-Methylnaphthalene	43	U	3580	2900		ug/Kg	☼	81	55 - 97
2-Methylphenol	45	U	3580	2830		ug/Kg	☼	79	46 - 98
2-Nitroaniline	130	U	3580	2740		ug/Kg	☼	76	45 - 111
2-Nitrophenol	150	U	3580	2840		ug/Kg	☼	79	38 - 115
3 & 4 Methylphenol	71	U	3580	3210		ug/Kg	☼	90	48 - 111
3,3'-Dichlorobenzidine	120	U	3580	2530		ug/Kg	☼	71	23 - 102
3-Nitroaniline	110	U	3580	2590		ug/Kg	☼	72	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3580	3140		ug/Kg	☼	88	15 - 118
4-Bromophenyl phenyl ether	52	U	3580	3160		ug/Kg	☼	88	53 - 110
4-Chloro-3-methylphenol	45	U	3580	2970		ug/Kg	☼	83	36 - 111
4-Chloroaniline	50	U	3580	2200		ug/Kg	☼	62	32 - 79
4-Chlorophenyl phenyl ether	46	U	3580	3010		ug/Kg	☼	84	51 - 103
4-Nitroaniline	80	U	3580	2850		ug/Kg	☼	80	36 - 102
4-Nitrophenol	350	U	3580	2750		ug/Kg	☼	77	40 - 113
Acenaphthene	37	U	3580	2980		ug/Kg	☼	83	53 - 105
Acenaphthylene	49	U	3580	2920		ug/Kg	☼	82	55 - 107

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-A-1-B MS
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Anthracene	53	U	3580	3100		ug/Kg	☼	87	55 - 103
Benzo[a]anthracene	64	U	3580	3150		ug/Kg	☼	88	48 - 112
Benzo[a]pyrene	96	U	3580	3080		ug/Kg	☼	86	46 - 117
Benzo[b]fluoranthene	36	U	3580	3030		ug/Kg	☼	85	45 - 125
Benzo[g,h,i]perylene	36	U	3580	4120		ug/Kg	☼	115	24 - 134
Benzo[k]fluoranthene	86	U	3580	2930		ug/Kg	☼	82	43 - 114
bis(2 chloro-1-methylethyl) ether	45	U	3580	2490		ug/Kg	☼	70	38 - 98
Bis(2-chloroethoxy)methane	40	U	3580	2700		ug/Kg	☼	75	49 - 100
Bis(2-chloroethyl)ether	36	U	3580	2340		ug/Kg	☼	65	49 - 100
Bis(2-ethylhexyl) phthalate	91	U	3580	3300		ug/Kg	☼	92	50 - 113
Butyl benzyl phthalate	99	U	3580	3260		ug/Kg	☼	91	54 - 112
Carbazole	51	U	3580	3090		ug/Kg	☼	86	47 - 102
Chrysene	49	U	3580	3160		ug/Kg	☼	88	45 - 115
Dibenz(a,h)anthracene	71	U	3580	3960		ug/Kg	☼	111	30 - 134
Dibenzofuran	44	U	3580	2960		ug/Kg	☼	83	50 - 102
Diethylphthalate	88	U	3580	3090		ug/Kg	☼	86	46 - 107
Di-n-butyl phthalate	69	U	3580	3170		ug/Kg	☼	88	49 - 107
Di-n-octyl phthalate	140	U	3580	3640		ug/Kg	☼	102	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3700		ug/Kg	☼	103	33 - 140
Fluoranthene	54	U	3580	3070		ug/Kg	☼	86	45 - 109
Fluorene	49	U	3580	3030		ug/Kg	☼	85	45 - 109
Hexachlorobenzene	45	U	3580	3170		ug/Kg	☼	89	48 - 113
Hexachlorobutadiene	43	U	3580	2930		ug/Kg	☼	82	48 - 109
Hexachlorocyclopentadiene	350	U	3580	2520		ug/Kg	☼	71	21 - 144
Hexachloroethane	37	U	3580	2500		ug/Kg	☼	70	44 - 102
Indeno[1,2,3-cd]pyrene	68	U	3580	4030		ug/Kg	☼	113	30 - 136
Isophorone	40	U	3580	2430		ug/Kg	☼	68	48 - 100
Naphthalene	38	U	3580	2810		ug/Kg	☼	79	54 - 98
Nitrobenzene	43	U	3580	2630		ug/Kg	☼	74	51 - 106
N-Nitrosodi-n-propylamine	43	U	3580	2670		ug/Kg	☼	75	47 - 104
Pentachlorophenol	350	U	3580	2640		ug/Kg	☼	74	23 - 116
Phenanthrene	45	U	3580	3050		ug/Kg	☼	85	53 - 106
Phenol	40	U	3580	2680		ug/Kg	☼	75	41 - 100
Pyrene	78	U	3580	3180		ug/Kg	☼	89	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*75*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-A-1-C MSD
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3580	2730		ug/Kg	☼	76	52 - 103	1	30
1,2-Dichlorobenzene	38	U	3580	2590		ug/Kg	☼	72	50 - 98	1	30
1,3-Dichlorobenzene	39	U	3580	2570		ug/Kg	☼	72	49 - 96	3	30
1,4-Dichlorobenzene	40	U	3580	2590		ug/Kg	☼	72	50 - 96	2	30
2,4,5-Trichlorophenol	56	U	3580	2960		ug/Kg	☼	83	41 - 116	3	30
2,4,6-Trichlorophenol	49	U	3580	2990		ug/Kg	☼	83	40 - 115	1	30
2,4-Dichlorophenol	42	U	3580	3170		ug/Kg	☼	88	47 - 104	6	30
2,4-Dimethylphenol	59	U	3580	2960		ug/Kg	☼	83	45 - 105	2	30
2,4-Dinitrophenol	350	U	3580	2530		ug/Kg	☼	71	10 - 100	5	30
2,4-Dinitrotoluene	140	U	3580	2910		ug/Kg	☼	81	42 - 113	2	30
2,6-Dinitrotoluene	67	U	3580	2920		ug/Kg	☼	82	46 - 109	2	30
2-Chloronaphthalene	40	U	3580	3060		ug/Kg	☼	85	52 - 108	3	30
2-Chlorophenol	41	U	3580	2890		ug/Kg	☼	81	48 - 102	1	30
2-Methylnaphthalene	43	U	3580	2980		ug/Kg	☼	83	55 - 97	3	30
2-Methylphenol	45	U	3580	2870		ug/Kg	☼	80	46 - 98	1	30
2-Nitroaniline	130	U	3580	2790		ug/Kg	☼	78	45 - 111	2	30
2-Nitrophenol	150	U	3580	2900		ug/Kg	☼	81	38 - 115	2	30
3 & 4 Methylphenol	71	U	3580	3340		ug/Kg	☼	93	48 - 111	4	30
3,3'-Dichlorobenzidine	120	U	3580	2460		ug/Kg	☼	69	23 - 102	3	30
3-Nitroaniline	110	U	3580	2640		ug/Kg	☼	74	32 - 95	2	30
4,6-Dinitro-2-methylphenol	350	U	3580	3160		ug/Kg	☼	88	15 - 118	0	30
4-Bromophenyl phenyl ether	52	U	3580	3110		ug/Kg	☼	87	53 - 110	2	30
4-Chloro-3-methylphenol	45	U	3580	2950		ug/Kg	☼	82	36 - 111	1	30
4-Chloroaniline	50	U	3580	2360		ug/Kg	☼	66	32 - 79	7	30
4-Chlorophenyl phenyl ether	46	U	3580	2960		ug/Kg	☼	83	51 - 103	2	30
4-Nitroaniline	80	U	3580	2900		ug/Kg	☼	81	36 - 102	2	30
4-Nitrophenol	350	U	3580	2860		ug/Kg	☼	80	40 - 113	4	30
Acenaphthene	37	U	3580	3020		ug/Kg	☼	84	53 - 105	1	30
Acenaphthylene	49	U	3580	2960		ug/Kg	☼	83	55 - 107	1	30
Anthracene	53	U	3580	3070		ug/Kg	☼	86	55 - 103	1	30
Benzo[a]anthracene	64	U	3580	3010		ug/Kg	☼	84	48 - 112	5	30
Benzo[a]pyrene	96	U	3580	2930		ug/Kg	☼	82	46 - 117	5	30
Benzo[b]fluoranthene	36	U	3580	2890		ug/Kg	☼	81	45 - 125	5	30
Benzo[g,h,i]perylene	36	U	3580	3890		ug/Kg	☼	109	24 - 134	6	30
Benzo[k]fluoranthene	86	U	3580	2740		ug/Kg	☼	77	43 - 114	7	30
bis(2 chloro-1-methylethyl) ether	45	U	3580	2430		ug/Kg	☼	68	38 - 98	3	30
Bis(2-chloroethoxy)methane	40	U	3580	2690		ug/Kg	☼	75	49 - 100	0	30
Bis(2-chloroethyl)ether	36	U	3580	2360		ug/Kg	☼	66	49 - 100	1	30
Bis(2-ethylhexyl) phthalate	91	U	3580	3160		ug/Kg	☼	88	50 - 113	4	30
Butyl benzyl phthalate	99	U	3580	3050		ug/Kg	☼	85	54 - 112	7	30
Carbazole	51	U	3580	3070		ug/Kg	☼	86	47 - 102	1	30
Chrysene	49	U	3580	3000		ug/Kg	☼	84	45 - 115	5	30
Dibenz(a,h)anthracene	71	U	3580	3670		ug/Kg	☼	103	30 - 134	7	30
Dibenzofuran	44	U	3580	2980		ug/Kg	☼	83	50 - 102	1	30
Diethylphthalate	88	U	3580	3080		ug/Kg	☼	86	46 - 107	0	30
Di-n-butyl phthalate	69	U	3580	3150		ug/Kg	☼	88	49 - 107	1	30
Di-n-octyl phthalate	140	U	3580	3430		ug/Kg	☼	96	35 - 125	6	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-A-1-C MSD
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3640		ug/Kg	☼	102	33 - 140	2	30
Fluoranthene	54	U	3580	3050		ug/Kg	☼	85	45 - 109	0	30
Fluorene	49	U	3580	2970		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3580	3090		ug/Kg	☼	86	48 - 113	3	30
Hexachlorobutadiene	43	U	3580	2980		ug/Kg	☼	83	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3580	2580		ug/Kg	☼	72	21 - 144	2	30
Hexachloroethane	37	U	3580	2590		ug/Kg	☼	72	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	68	U	3580	3760		ug/Kg	☼	105	30 - 136	7	30
Isophorone	40	U	3580	2470		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	38	U	3580	2880		ug/Kg	☼	80	54 - 98	2	30
Nitrobenzene	43	U	3580	2740		ug/Kg	☼	76	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3580	2680		ug/Kg	☼	75	47 - 104	0	30
Pentachlorophenol	350	U	3580	2750		ug/Kg	☼	77	23 - 116	4	30
Phenanthrene	45	U	3580	3080		ug/Kg	☼	86	53 - 106	1	30
Phenol	40	U	3580	2660		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3580	3010		ug/Kg	☼	84	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*76*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404463/1-A
Matrix: Solid
Analysis Batch: 407098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404463

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32122-1	B3L1W7	90	102	94	99
160-32122-2	B3L1X3	91	98	95	99
160-32122-2 MS	B3L1X3	85	98	94	99
160-32122-2 MSD	B3L1X3	87	99	95	99
160-32122-3	B3L222	89	93	92	97
160-32122-4	B3L1X9	91	100	95	99
160-32122-5	B3L1X6	90	109	97	100
160-32122-6	B3L229	94	95	99	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406161/5	Lab Control Sample	86	96	96	99
LCSD 160-406161/6	Lab Control Sample Dup	84	96	98	100
MB 160-406161/8	Method Blank	87	96	98	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32122-1 - DL	B3L1W7	0 X	0 X	0 X	0 X	0 X	0 X
160-32122-2 - DL	B3L1X3	0 X	0 X	0 X	0 X	0 X	0 X
160-32122-3 - DL	B3L222	55	70	61	48	61	77
160-32122-4 - DL	B3L1X9	64	85	79	60	75	86
160-32122-5 - DL	B3L1X6	74	76	71	58	69	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32124-A-1-B MS	Matrix Spike	82	85	79	75	75	91
160-32124-A-1-C MSD	Matrix Spike Duplicate	86	87	84	76	76	86
LCS 160-404561/2-A	Lab Control Sample	82	85	77	74	73	91
MB 160-404561/1-A	Method Blank	61	74	71	60	64	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32122-7	B3L1X2	87	82
160-32122-7 MS	B3L1X2	73	76
160-32122-7 MSD	B3L1X2	91	85
160-32122-8	B3L1X5	87	82
160-32122-9	B3L221	80	78
160-32122-10	B3L1W6	82	83
160-32122-11	B3L1X8	82	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404463/2-A	Lab Control Sample	80	80
MB 160-404463/1-A	Method Blank	84	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32143-12 MSD
Matrix: Soil
Analysis Batch: 406289

Client Sample ID: B3L210
Prep Type: Total/NA
Prep Batch: 406397

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	2.8	U T	58.0	30.8	T	ug/Kg	☼	53	62 - 118	7	20
4-Methyl-2-pentanone (MIBK)	2.1	U	58.0	43.9		ug/Kg	☼	76	73 - 125	0	20
Acetone	7.5	J T	58.0	175	T	ug/Kg	☼	289	54 - 139	10	20
Benzene	0.21	U	58.0	59.6		ug/Kg	☼	103	80 - 120	0	20
Bromodichloromethane	0.41	U	58.0	56.0		ug/Kg	☼	97	80 - 120	3	20
Bromoform	1.6	U	58.0	66.6		ug/Kg	☼	115	80 - 125	5	20
Bromomethane	1.9	U	58.0	43.1		ug/Kg	☼	74	70 - 126	0	20
Carbon disulfide	0.57	U	58.0	53.1		ug/Kg	☼	92	79 - 121	4	20
Carbon tetrachloride	0.42	U	58.0	48.8		ug/Kg	☼	84	80 - 120	3	20
Chlorobenzene	0.67	U	58.0	59.5		ug/Kg	☼	103	80 - 120	0	20
Chloroethane	1.6	U o	58.0	39.3		ug/Kg	☼	68	64 - 133	1	20
Chloroform	0.31	U	58.0	53.6		ug/Kg	☼	92	80 - 120	1	20
Chloromethane	0.53	U	58.0	48.1		ug/Kg	☼	83	75 - 120	2	20
cis-1,3-Dichloropropene	1.7	U	58.0	58.9		ug/Kg	☼	102	80 - 120	2	20
Dibromochloromethane	1.0	U	58.0	60.4		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.57	U	58.0	54.5		ug/Kg	☼	94	80 - 120	4	20
Methylene Chloride	1.6	J	58.0	64.2		ug/Kg	☼	108	77 - 123	1	20
Styrene	1.6	U	58.0	61.7		ug/Kg	☼	106	80 - 120	5	20
Tetrachloroethene	0.46	U	58.0	52.9		ug/Kg	☼	91	80 - 120	7	20
Toluene	2.1	U	58.0	65.6		ug/Kg	☼	113	80 - 124	1	20
trans-1,3-Dichloropropene	1.4	U	58.0	58.3		ug/Kg	☼	101	80 - 122	0	20
Trichloroethene	0.32	U	58.0	67.5		ug/Kg	☼	116	79 - 120	4	20
Vinyl chloride	0.35	U	58.0	44.6		ug/Kg	☼	77	71 - 120	1	20
Xylenes, Total	0.70	U	116	123		ug/Kg	☼	106	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*67 - 132*
4-Bromofluorobenzene (Surr)	*113*		*59 - 150*
Dibromofluoromethane (Surr)	*94*		*53 - 143*
Toluene-d8 (Surr)	*109*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404663/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404663

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 13:58	12/13/18 18:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404663/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404663

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Methylphenol	42	U	330	42	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
2-Picoline	45	U	660	45	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Acenaphthene	35	U	330	35	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Acenaphthylene	46	U	330	46	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Acetophenone	34	U	330	34	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Aniline	60	U	330	60	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Anthracene	49	U	330	49	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Aramite	330	U	660	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404663/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404663

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Carbazole	47	U	330	47	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Chrysene	46	U	330	46	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Diallate	67	U	660	67	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Dibenzofuran	41	U	330	41	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Diethylphthalate	82	U	330	82	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Dimethoate	100	U	660	100	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Dinoseb	330	U	660	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Disulfoton	41	U	1600	41	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Famphur	33	U	3300	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Fluoranthene	50	U	330	50	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Fluorene	46	U	330	46	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachloroethane	35	U	330	35	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Isodrin	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Isophorone	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Isosafrole	67	U	660	67	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Kepone	330	U	3300	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Methapyrilene	140	U	1600	140	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Methyl parathion	120	U	1600	120	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Naphthalene	35	U	330	35	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Nitrobenzene	40	U	330	40	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404663/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404663

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Parathion	98	U	1600	98	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Phenacetin	54	U	660	54	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Phenanthrene	42	U	330	42	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Phenol	38	U	330	38	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Phorate	37	U	1600	37	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pronamide	53	U	660	53	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pyrene	73	U	330	73	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Pyridine	71	U	660	71	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Safrole	33	U	660	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/07/18 13:58	12/13/18 18:27	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/07/18 13:58	12/13/18 18:27	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*468*	*N*	*ug/Kg*		*4.26*		*12/07/18 13:58*	*12/13/18 18:27*	*1*
Unknown	*13000*	*N*	*ug/Kg*		*4.60*		*12/07/18 13:58*	*12/13/18 18:27*	*1*
Unknown	*498*	*N*	*ug/Kg*		*5.14*		*12/07/18 13:58*	*12/13/18 18:27*	*1*
n-Hexadecanoic acid	*319*	*N J*	*ug/Kg*		*10.98*	*57-10-3*	*12/07/18 13:58*	*12/13/18 18:27*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*65*		*47 - 125*	*12/07/18 13:58*	*12/13/18 18:27*	*1*
2-Fluorobiphenyl (Surr)	*78*		*59 - 110*	*12/07/18 13:58*	*12/13/18 18:27*	*1*
2-Fluorophenol (Surr)	*77*		*54 - 102*	*12/07/18 13:58*	*12/13/18 18:27*	*1*
Nitrobenzene-d5 (Surr)	*63*		*44 - 120*	*12/07/18 13:58*	*12/13/18 18:27*	*1*
Phenol-d5 (Surr)	*69*		*51 - 104*	*12/07/18 13:58*	*12/13/18 18:27*	*1*
Terphenyl-d14 (Surr)	*79*		*59 - 98*	*12/07/18 13:58*	*12/13/18 18:27*	*1*

Lab Sample ID: LCS 160-404663/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2400		ug/Kg		72	58 - 101
1,2-Dichlorobenzene	3330	2280		ug/Kg		68	57 - 99
1,3-Dichlorobenzene	3330	2190		ug/Kg		66	55 - 98
1,4-Dichlorobenzene	3330	2330		ug/Kg		70	56 - 98
2,4,5-Trichlorophenol	3330	2620		ug/Kg		79	56 - 109
2,4,6-Trichlorophenol	3330	2700		ug/Kg		81	56 - 110
2,4-Dichlorophenol	3330	2750		ug/Kg		82	57 - 99
2,4-Dimethylphenol	3330	2630		ug/Kg		79	53 - 97

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404663/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dinitrophenol	3330	1990		ug/Kg		60	10 - 89
2,4-Dinitrotoluene	3330	2670		ug/Kg		80	54 - 105
2,6-Dinitrotoluene	3330	2510		ug/Kg		75	55 - 105
2-Chloronaphthalene	3330	2650		ug/Kg		79	56 - 111
2-Chlorophenol	3330	2550		ug/Kg		77	56 - 99
2-Methylnaphthalene	3330	2570		ug/Kg		77	58 - 98
2-Methylphenol	3330	2500		ug/Kg		75	53 - 97
2-Nitroaniline	3330	2520		ug/Kg		76	55 - 108
2-Nitrophenol	3330	2550		ug/Kg		77	59 - 104
3 & 4 Methylphenol	3330	2860		ug/Kg		86	58 - 108
3,3'-Dichlorobenzidine	3330	2350		ug/Kg		70	42 - 104
3-Nitroaniline	3330	2460		ug/Kg		74	43 - 96
4,6-Dinitro-2-methylphenol	3330	2600		ug/Kg		78	19 - 102
4-Bromophenyl phenyl ether	3330	2880		ug/Kg		86	58 - 109
4-Chloro-3-methylphenol	3330	2670		ug/Kg		80	54 - 98
4-Chloroaniline	3330	2140		ug/Kg		64	41 - 83
4-Chlorophenyl phenyl ether	3330	2610		ug/Kg		78	55 - 105
4-Nitroaniline	3330	2570		ug/Kg		77	49 - 99
4-Nitrophenol	3330	2420		ug/Kg		73	48 - 106
Acenaphthene	3330	2670		ug/Kg		80	55 - 106
Acenaphthylene	3330	2620		ug/Kg		79	56 - 109
Anthracene	3330	2770		ug/Kg		83	56 - 103
Benzo[a]anthracene	3330	2760		ug/Kg		83	56 - 107
Benzo[a]pyrene	3330	2650		ug/Kg		79	57 - 109
Benzo[b]fluoranthene	3330	2550		ug/Kg		76	68 - 109
Benzo[g,h,i]perylene	3330	3040		ug/Kg		91	51 - 126
Benzo[k]fluoranthene	3330	2490		ug/Kg		75	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2170		ug/Kg		65	49 - 94
Bis(2-chloroethoxy)methane	3330	2370		ug/Kg		71	56 - 99
Bis(2-chloroethyl)ether	3330	2090		ug/Kg		63	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2900		ug/Kg		87	59 - 113
Butyl benzyl phthalate	3330	2770		ug/Kg		83	60 - 112
Carbazole	3330	2800		ug/Kg		84	53 - 98
Chrysene	3330	2790		ug/Kg		84	54 - 107
Dibenz(a,h)anthracene	3330	3220		ug/Kg		97	52 - 126
Dibenzofuran	3330	2620		ug/Kg		79	55 - 103
Diethylphthalate	3330	2770		ug/Kg		83	54 - 101
Di-n-butyl phthalate	3330	2840		ug/Kg		85	57 - 102
Di-n-octyl phthalate	3330	3160		ug/Kg		95	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3320		ug/Kg		100	63 - 121
Fluoranthene	3330	2730		ug/Kg		82	54 - 100
Fluorene	3330	2730		ug/Kg		82	57 - 106
Hexachlorobenzene	3330	2810		ug/Kg		84	57 - 109
Hexachlorobutadiene	3330	2630		ug/Kg		79	59 - 106
Hexachlorocyclopentadiene	3330	2300		ug/Kg		69	44 - 140
Hexachloroethane	3330	2250		ug/Kg		68	56 - 102
Indeno[1,2,3-cd]pyrene	3330	3260		ug/Kg		98	52 - 132

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404663/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Isophorone	3330	2230		ug/Kg		67	55 - 96
Naphthalene	3330	2550		ug/Kg		76	57 - 98
Nitrobenzene	3330	2440		ug/Kg		73	58 - 102
N-Nitrosodi-n-propylamine	3330	2370		ug/Kg		71	54 - 98
Pentachlorophenol	3330	2470		ug/Kg		74	35 - 107
Phenanthrene	3330	2780		ug/Kg		84	57 - 103
Phenol	3330	2370		ug/Kg		71	50 - 96
Pyrene	3330	2750		ug/Kg		83	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*80*		*54 - 102*
Nitrobenzene-d5 (Surr)	*76*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-32143-3 MS
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	180	U D	3650	2270	D	ug/Kg	☼	62	52 - 103
1,2-Dichlorobenzene - DL	190	U D	3650	2480	D	ug/Kg	☼	68	50 - 98
1,3-Dichlorobenzene - DL	200	U D	3650	2450	D	ug/Kg	☼	67	49 - 96
1,4-Dichlorobenzene - DL	200	U D	3650	2480	D	ug/Kg	☼	68	50 - 96
2,4,5-Trichlorophenol - DL	280	U D	3650	2770	D	ug/Kg	☼	76	41 - 116
2,4,6-Trichlorophenol - DL	250	U D	3650	2920	D	ug/Kg	☼	80	40 - 115
2,4-Dichlorophenol - DL	210	U D	3650	2730	D	ug/Kg	☼	75	47 - 104
2,4-Dimethylphenol - DL	300	U D	3650	2670	D	ug/Kg	☼	73	45 - 105
2,4-Dinitrophenol - DL	1800	U D	3650	2260	J D	ug/Kg	☼	62	10 - 100
2,4-Dinitrotoluene - DL	690	U D	3650	2670	D	ug/Kg	☼	73	42 - 113
2,6-Dinitrotoluene - DL	340	U D	3650	2630	D	ug/Kg	☼	72	46 - 109
2-Chloronaphthalene - DL	200	U D	3650	2750	D	ug/Kg	☼	75	52 - 108
2-Chlorophenol - DL	210	U D	3650	2600	D	ug/Kg	☼	71	48 - 102
2-Methylnaphthalene - DL	220	U D	3650	2620	D	ug/Kg	☼	72	55 - 97
2-Methylphenol - DL	230	U D	3650	2800	D	ug/Kg	☼	77	46 - 98
2-Nitroaniline - DL	650	U D	3650	2860	D	ug/Kg	☼	78	45 - 111
2-Nitrophenol - DL	790	U D	3650	2530	D	ug/Kg	☼	69	38 - 115
3 & 4 Methylphenol - DL	360	U D	3650	3160	J D	ug/Kg	☼	87	48 - 111
3,3'-Dichlorobenzidine - DL	620	U D	3650	2180	J D	ug/Kg	☼	60	23 - 102
3-Nitroaniline - DL	560	U D	3650	2660	D	ug/Kg	☼	73	32 - 95
4,6-Dinitro-2-methylphenol - DL	1800	U D	3650	2600	J D	ug/Kg	☼	71	15 - 118
4-Bromophenyl phenyl ether - DL	270	U D	3650	2560	D	ug/Kg	☼	70	53 - 110
4-Chloro-3-methylphenol - DL	230	U D	3650	2740	D	ug/Kg	☼	75	36 - 111
4-Chloroaniline - DL	250	U D	3650	2090	D	ug/Kg	☼	57	32 - 79

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32143-3 MS
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorophenyl phenyl ether - DL	240	U D	3650	2770	D	ug/Kg	☼	76	51 - 103
4-Nitroaniline - DL	410	U D	3650	2700	J D	ug/Kg	☼	74	36 - 102
4-Nitrophenol - DL	1800	U D	3650	2640	J D	ug/Kg	☼	72	40 - 113
Acenaphthene - DL	190	U D	3650	2860	D	ug/Kg	☼	78	53 - 105
Acenaphthylene - DL	250	U D	3650	2640	D	ug/Kg	☼	72	55 - 107
Anthracene - DL	270	U D	3650	2640	D	ug/Kg	☼	72	55 - 103
Benzo[a]anthracene - DL	320	U D	3650	2880	D	ug/Kg	☼	79	48 - 112
Benzo[a]pyrene - DL	490	U D	3650	2830	D	ug/Kg	☼	78	46 - 117
Benzo[b]fluoranthene - DL	180	U D	3650	2770	D	ug/Kg	☼	76	45 - 125
Benzo[g,h,i]perylene - DL	180	U D	3650	3830	D	ug/Kg	☼	105	24 - 134
Benzo[k]fluoranthene - DL	440	U D	3650	2700	D	ug/Kg	☼	74	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	230	U D	3650	2490	D	ug/Kg	☼	68	38 - 98
Bis(2-chloroethoxy)methane - DL	210	U D	3650	2470	D	ug/Kg	☼	68	49 - 100
Bis(2-chloroethyl)ether - DL	180	U D	3650	2350	D	ug/Kg	☼	64	49 - 100
Bis(2-ethylhexyl) phthalate - DL	460	U D	3650	3190	D	ug/Kg	☼	87	50 - 113
Butyl benzyl phthalate - DL	510	U D	3650	3010	D	ug/Kg	☼	82	54 - 112
Carbazole - DL	260	U D	3650	2740	D	ug/Kg	☼	75	47 - 102
Chrysene - DL	250	U D	3650	2820	D	ug/Kg	☼	77	45 - 115
Dibenz(a,h)anthracene - DL	360	U D	3650	3540	D	ug/Kg	☼	97	30 - 134
Dibenzofuran - DL	220	U D	3650	2720	D	ug/Kg	☼	75	50 - 102
Diethylphthalate - DL	450	U D	3650	3040	D	ug/Kg	☼	83	46 - 107
Di-n-butyl phthalate - DL	350	U D	3650	2990	D	ug/Kg	☼	82	49 - 107
Di-n-octyl phthalate - DL	730	U D	3650	3430	D	ug/Kg	☼	94	35 - 125
Diphenylamine + N-Nitrosodiphenylamine - DL	180	U D	3650	3350	D	ug/Kg	☼	92	33 - 140
Fluoranthene - DL	450	J D	3650	3020	D	ug/Kg	☼	71	45 - 109
Fluorene - DL	250	U D	3650	2800	D	ug/Kg	☼	77	45 - 109
Hexachlorobenzene - DL	230	U D	3650	2580	D	ug/Kg	☼	71	48 - 113
Hexachlorobutadiene - DL	220	U D	3650	2410	D	ug/Kg	☼	66	48 - 109
Hexachlorocyclopentadiene - DL	1800	U D	3650	1890	J D	ug/Kg	☼	52	21 - 144
Hexachloroethane - DL	190	U D	3650	2620	D	ug/Kg	☼	72	44 - 102
Indeno[1,2,3-cd]pyrene - DL	340	U D	3650	3660	D	ug/Kg	☼	100	30 - 136
Isophorone - DL	200	U D	3650	2290	D	ug/Kg	☼	63	48 - 100
Naphthalene - DL	190	U D	3650	2480	D	ug/Kg	☼	68	54 - 98
Nitrobenzene - DL	220	U D	3650	2460	D	ug/Kg	☼	67	51 - 106
N-Nitrosodi-n-propylamine - DL	220	U D	3650	2780	D	ug/Kg	☼	76	47 - 104
Pentachlorophenol - DL	1800	U D	3650	2410	J D	ug/Kg	☼	66	23 - 116
Phenanthrene - DL	230	U D	3650	2870	D	ug/Kg	☼	79	53 - 106
Phenol - DL	210	U D	3650	2640	D	ug/Kg	☼	72	41 - 100
Pyrene - DL	400	U D	3650	2760	D	ug/Kg	☼	76	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*69*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*78*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*66*		*44 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32143-3 MS
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Phenol-d5 (Surr) - DL	*70*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*77*		*59 - 98*

Lab Sample ID: 160-32143-3 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	180	U D	3630	2500	D	ug/Kg	☼	69	52 - 103	10	30
1,2-Dichlorobenzene - DL	190	U D	3630	2430	D	ug/Kg	☼	67	50 - 98	2	30
1,3-Dichlorobenzene - DL	200	U D	3630	2370	D	ug/Kg	☼	65	49 - 96	3	30
1,4-Dichlorobenzene - DL	200	U D	3630	2420	D	ug/Kg	☼	67	50 - 96	2	30
2,4,5-Trichlorophenol - DL	280	U D	3630	2730	D	ug/Kg	☼	75	41 - 116	1	30
2,4,6-Trichlorophenol - DL	250	U D	3630	2750	D	ug/Kg	☼	76	40 - 115	6	30
2,4-Dichlorophenol - DL	210	U D	3630	2820	D	ug/Kg	☼	78	47 - 104	3	30
2,4-Dimethylphenol - DL	300	U D	3630	2630	D	ug/Kg	☼	72	45 - 105	2	30
2,4-Dinitrophenol - DL	1800	U D	3630	2200	J D	ug/Kg	☼	61	10 - 100	3	30
2,4-Dinitrotoluene - DL	690	U D	3630	2740	D	ug/Kg	☼	75	42 - 113	2	30
2,6-Dinitrotoluene - DL	340	U D	3630	2310	D	ug/Kg	☼	64	46 - 109	13	30
2-Chloronaphthalene - DL	200	U D	3630	2720	D	ug/Kg	☼	75	52 - 108	1	30
2-Chlorophenol - DL	210	U D	3630	2600	D	ug/Kg	☼	72	48 - 102	0	30
2-Methylnaphthalene - DL	220	U D	3630	2780	D	ug/Kg	☼	77	55 - 97	6	30
2-Methylphenol - DL	230	U D	3630	2480	D	ug/Kg	☼	68	46 - 98	12	30
2-Nitroaniline - DL	650	U D	3630	2640	D	ug/Kg	☼	73	45 - 111	8	30
2-Nitrophenol - DL	790	U D	3630	2500	D	ug/Kg	☼	69	38 - 115	1	30
3 & 4 Methylphenol - DL	360	U D	3630	2910	J D	ug/Kg	☼	80	48 - 111	8	30
3,3'-Dichlorobenzidine - DL	620	U D	3630	2180	J D	ug/Kg	☼	60	23 - 102	0	30
3-Nitroaniline - DL	560	U D	3630	2280	D	ug/Kg	☼	63	32 - 95	16	30
4,6-Dinitro-2-methylphenol - DL	1800	U D	3630	2400	J D	ug/Kg	☼	66	15 - 118	8	30
4-Bromophenyl phenyl ether - DL	270	U D	3630	2370	D	ug/Kg	☼	65	53 - 110	8	30
4-Chloro-3-methylphenol - DL	230	U D	3630	2730	D	ug/Kg	☼	75	36 - 111	0	30
4-Chloroaniline - DL	250	U D	3630	2010	D	ug/Kg	☼	55	32 - 79	4	30
4-Chlorophenyl phenyl ether - DL	240	U D	3630	2630	D	ug/Kg	☼	72	51 - 103	5	30
4-Nitroaniline - DL	410	U D	3630	2560	J D	ug/Kg	☼	70	36 - 102	5	30
4-Nitrophenol - DL	1800	U D	3630	2660	J D	ug/Kg	☼	73	40 - 113	1	30
Acenaphthene - DL	190	U D	3630	2800	D	ug/Kg	☼	77	53 - 105	2	30
Acenaphthylene - DL	250	U D	3630	2590	D	ug/Kg	☼	71	55 - 107	2	30
Anthracene - DL	270	U D	3630	2480	D	ug/Kg	☼	68	55 - 103	6	30
Benzo[a]anthracene - DL	320	U D	3630	2610	D	ug/Kg	☼	72	48 - 112	10	30
Benzo[a]pyrene - DL	490	U D	3630	2590	D	ug/Kg	☼	71	46 - 117	9	30
Benzo[b]fluoranthene - DL	180	U D	3630	2640	D	ug/Kg	☼	73	45 - 125	5	30
Benzo[g,h,i]perylene - DL	180	U D	3630	3650	D	ug/Kg	☼	100	24 - 134	5	30
Benzo[k]fluoranthene - DL	440	U D	3630	2590	D	ug/Kg	☼	71	43 - 114	4	30
bis(2 chloro-1-methylethyl) ether - DL	230	U D	3630	2250	D	ug/Kg	☼	62	38 - 98	10	30
Bis(2-chloroethoxy)methane - DL	210	U D	3630	2580	D	ug/Kg	☼	71	49 - 100	4	30
Bis(2-chloroethyl)ether - DL	180	U D	3630	2220	D	ug/Kg	☼	61	49 - 100	6	30
Bis(2-ethylhexyl) phthalate - DL	460	U D	3630	2990	D	ug/Kg	☼	82	50 - 113	7	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32143-3 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Butyl benzyl phthalate - DL	510	U D	3630	2840	D	ug/Kg	☼	78	54 - 112	6	30
Carbazole - DL	260	U D	3630	2610	D	ug/Kg	☼	72	47 - 102	5	30
Chrysene - DL	250	U D	3630	2630	D	ug/Kg	☼	72	45 - 115	7	30
Dibenz(a,h)anthracene - DL	360	U D	3630	3200	D	ug/Kg	☼	88	30 - 134	10	30
Dibenzofuran - DL	220	U D	3630	2680	D	ug/Kg	☼	74	50 - 102	2	30
Diethylphthalate - DL	450	U D	3630	2850	D	ug/Kg	☼	78	46 - 107	6	30
Di-n-butyl phthalate - DL	350	U D	3630	2740	D	ug/Kg	☼	75	49 - 107	9	30
Di-n-octyl phthalate - DL	730	U D	3630	3200	D	ug/Kg	☼	88	35 - 125	7	30
Diphenylamine + N-Nitrosodiphenylamine - DL	180	U D	3630	3040	D	ug/Kg	☼	84	33 - 140	10	30
Fluoranthene - DL	450	J D	3630	2850	D	ug/Kg	☼	66	45 - 109	6	30
Fluorene - DL	250	U D	3630	2690	D	ug/Kg	☼	74	45 - 109	4	30
Hexachlorobenzene - DL	230	U D	3630	2600	D	ug/Kg	☼	72	48 - 113	1	30
Hexachlorobutadiene - DL	220	U D	3630	2730	D	ug/Kg	☼	75	48 - 109	12	30
Hexachlorocyclopentadiene - DL	1800	U D	3630	2050	J D	ug/Kg	☼	56	21 - 144	8	30
Hexachloroethane - DL	190	U D	3630	2210	D	ug/Kg	☼	61	44 - 102	17	30
Indeno[1,2,3-cd]pyrene - DL	340	U D	3630	3460	D	ug/Kg	☼	95	30 - 136	6	30
Isophorone - DL	200	U D	3630	2120	D	ug/Kg	☼	58	48 - 100	7	30
Naphthalene - DL	190	U D	3630	2690	D	ug/Kg	☼	74	54 - 98	8	30
Nitrobenzene - DL	220	U D	3630	2510	D	ug/Kg	☼	69	51 - 106	2	30
N-Nitrosodi-n-propylamine - DL	220	U D	3630	2350	D	ug/Kg	☼	65	47 - 104	17	30
Pentachlorophenol - DL	1800	U D	3630	2340	J D	ug/Kg	☼	64	23 - 116	3	30
Phenanthrene - DL	230	U D	3630	2630	D	ug/Kg	☼	72	53 - 106	9	30
Phenol - DL	210	U D	3630	2440	D	ug/Kg	☼	67	41 - 100	8	30
Pyrene - DL	400	U D	3630	2570	D	ug/Kg	☼	71	39 - 130	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*61*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*74*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*68*		*44 - 120*
Phenol-d5 (Surr) - DL	*70*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*71*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32143-1
SDG: SL32143-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32143-3 - DL	B3L207	68	80	78	58	69	89
160-32143-3 MS - DL	B3L207	69	77	78	66	70	77
160-32143-3 MSD - DL	B3L207	61	74	76	68	70	71
160-32143-4 - DL	B3L1X0	0 X	0 X	0 X	0 X	0 X	0 X
160-32143-5 - DL	B3L1Y2	67	80	76	59	74	86
160-32143-6 - DL	B3L213	75	86	84	66	78	93
160-32143-7	B3L219	75	76	78	60	73	79
160-32143-8 - DL	B3L1V8	75	80	78	58	71	86
160-32143-9 - DL	B3L1V2	69	78	79	65	77	86
160-32143-10 - DL	B3L1Y5	0 X	0 X	0 X	0 X	0 X	0 X
160-32143-11 - DL	B3L225	67	73	70	58	66	77
160-32143-12 - DL	B3L210	69	86	79	68	72	92
160-32143-13 - DL	B3L1Y8	0 X	0 X	0 X	0 X	0 X	0 X
160-32143-14	B3L216	74	80	80	65	74	79
160-32143-15 - DL	B3L1W4	82	80	79	62	73	87
160-32143-16 - DL	B3L201	64	76	79	63	71	86
160-32143-17 - DL	B3L204	0 X	0 X	0 X	0 X	0 X	0 X
160-32143-18 - DL	B3L1W1	78	80	79	62	71	89
160-32143-19 - DL	B3L1V5	71	80	85	64	79	86
160-32143-20 - DL	B3L1T9	66	81	80	60	73	81

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404663/2-A	Lab Control Sample	81	82	80	76	73	86
MB 160-404663/1-A	Method Blank	65	78	77	63	69	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

GEL LABORATORIES LLC

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QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466073**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1830852											
QC1204178404 LCS											
Diesel Range Organics	66700				64000	UG/KG		96	(70%-130%)	LXA1	12/14/18 16:11
**o-Terphenyl	667				611	UG/KG		92	(50%-150%)		
QC1204178403 MB											
Diesel Range Organics				U	2170	UG/KG					12/14/18 15:32
**o-Terphenyl	667				448	UG/KG		67	(50%-150%)		
QC1204178405 466073006 MS											
Diesel Range Organics	71200	U	2310		71100	UG/KG		100	(70%-130%)		12/14/18 17:29
**o-Terphenyl	712		484		666	UG/KG		94	(50%-150%)		
QC1204178406 466073006 MSD											
Diesel Range Organics	71400	U	2310		66700	UG/KG	6	93	(0%-20%)		12/14/18 18:07
**o-Terphenyl	714		484		642	UG/KG		90	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466073

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204178403	MB for batch 1830851	67
1204178404	LCS for batch 1830851	92
466073006	B3MN43	68
1204178405	B3MN43MS	94
1204178406	B3MN43MSD	90
466073007	B3MN45	76
466073008	B3MN46	92
466073009	B3MN47	86
466073010	B3MN58	83

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 19, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466073**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1829740										
QC1204175769 LCS										
Gasoline Range Organics	500			517	UG/KG		103	(70%-130%)	RXY1	12/11/18 12:10
**Bromofluorobenzene	50.0			42.8	UG/KG		86	(50%-150%)		
QC1204175766 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/11/18 12:38
**Bromofluorobenzene	50.0			42.7	UG/KG		85	(50%-150%)		
QC1204175773 466073008 PS										
Gasoline Range Organics	500	TU	0.00	373	ug/L		75	(70%-130%)		12/11/18 21:19
**Bromofluorobenzene	50.0		34.3	30.9	ug/L		62	(50%-150%)		
QC1204175776 466073008 PSD										
Gasoline Range Organics	500	TU	0.00 T	338	ug/L	10	68 *	(0%-20%)		12/11/18 21:46
**Bromofluorobenzene	50.0		34.3	28.6	ug/L		57	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466073

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204175769	LCS for batch 1829739	86
1204175766	MB for batch 1829739	85
466073006	B3MN43	68
466073007	B3MN45	71
466073008	B3MN46	69
466073009	B3MN47	73
466073010	B3MN58	68
1204175773	B3MN46PS	62
1204175776	B3MN46PSD	57

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466240**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1830747											
QC1204178219 LCS											
Diesel Range Organics	66600				66000	UG/KG		99	(70%-130%)	LXA1	12/14/18 23:16
**o-Terphenyl	666				619	UG/KG		93	(50%-150%)		
QC1204178218 MB											
Diesel Range Organics				U	2170	UG/KG					12/14/18 22:37
**o-Terphenyl	666				563	UG/KG		85	(50%-150%)		
QC1204178220 466240009 MS											
Diesel Range Organics	71700	U	2340		64300	UG/KG		90	(70%-130%)		12/15/18 00:33
**o-Terphenyl	717		564		637	UG/KG		89	(50%-150%)		
QC1204178221 466240009 MSD											
Diesel Range Organics	71800	U	2340		62900	UG/KG	2	88	(0%-20%)		12/15/18 01:12
**o-Terphenyl	718		564		586	UG/KG		82	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466240

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204178218	MB for batch 1830739	85
1204178219	LCS for batch 1830739	93
466240009	B3MN52	78
1204178220	B3MN52MS	89
1204178221	B3MN52MSD	82
466240010	B3MN50	68
466240011	B3MN40	82
466240012	B3MN59	59
466240013	B3MN41	83
466240014	B3MN55	80
466240015	B3MN57	78
466240016	B3MN38	90

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 19, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466240**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics											
Batch 1829740											
QC1204175770 LCS											
Gasoline Range Organics	500				588	UG/KG		118	(70%-130%)	RXY1	12/18/18 11:26
**Bromofluorobenzene	50.0				47.2	UG/KG		94	(50%-150%)		
QC1204175767 MB											
Gasoline Range Organics				U	16.7	UG/KG					12/18/18 11:54
**Bromofluorobenzene	50.0				49.7	UG/KG		99	(50%-150%)		
QC1204175774 466240009 PS											
Gasoline Range Organics	500	TU	0.00	T	322	ug/L		64*	(70%-130%)		12/18/18 19:36
**Bromofluorobenzene	50.0		40.2		42.4	ug/L		85	(50%-150%)		
QC1204175777 466240009 PSD											
Gasoline Range Organics	500	TU	0.00		455	ug/L	34*	91	(0%-20%)		12/18/18 20:04
**Bromofluorobenzene	50.0		40.2		39.4	ug/L		79	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466240

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204175770	LCS for batch 1829739	94
1204175767	MB for batch 1829739	99
466240009	B3MN52	80
466240010	B3MN50	96
466240011	B3MN40	96
466240012	B3MN59	86
466240013	B3MN41	88
466240014	B3MN55	78
466240015	B3MN57	84
466240016	B3MN38	81
1204175774	B3MN52PS	85
1204175777	B3MN52PSD	79

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466294**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1830747											
QC1204178219 LCS											
Diesel Range Organics	66600				66000	UG/KG		99	(70%-130%)	LXA1	12/14/18 23:16
**o-Terphenyl	666				619	UG/KG		93	(50%-150%)		
QC1204178218 MB											
Diesel Range Organics				U	2170	UG/KG					12/14/18 22:37
**o-Terphenyl	666				563	UG/KG		85	(50%-150%)		
QC1204178220 466240009 MS											
Diesel Range Organics	71700	U	2340		64300	UG/KG		90	(70%-130%)		12/15/18 00:33
**o-Terphenyl	717		564		637	UG/KG		89	(50%-150%)		
QC1204178221 466240009 MSD											
Diesel Range Organics	71800	U	2340		62900	UG/KG	2	88	(0%-20%)		12/15/18 01:12
**o-Terphenyl	718		564		586	UG/KG		82	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466294

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204178218	MB for batch 1830739	85
1204178219	LCS for batch 1830739	93
1204178220	B3MN52MS	89
1204178221	B3MN52MSD	82
466294011	B3MN42	82
466294012	B3MN53	74
466294013	B3MN54	91
466294014	B3MN48	101
466294015	B3MN37	90
466294016	B3MN56	101
466294017	B3MN44	90
466294018	B3MN51	69
466294019	B3MN49	82
466294020	B3MN39	81

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 26, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466294**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1832719										
QC1204182419 LCS										
Gasoline Range Organics	500			431	UG/KG		86	(70%-130%)	RXY1	12/22/18 13:19
**Bromofluorobenzene	50.0			52.6	UG/KG		105	(50%-150%)		
QC1204182418 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/22/18 13:47
**Bromofluorobenzene	50.0			44.9	UG/KG		90	(50%-150%)		
QC1204182420 466294011 PS										
Gasoline Range Organics	500 TUX	0.00	X	374	ug/L		75	(70%-130%)		12/23/18 04:52
**Bromofluorobenzene	50.0	39.9		41.3	ug/L		83	(50%-150%)		
QC1204182421 466294011 PSD										
Gasoline Range Organics	500 TUX	0.00	TX	269	ug/L	33*	54*	(0%-20%)		12/23/18 05:20
**Bromofluorobenzene	50.0	39.9		36.7	ug/L		73	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466294

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204182419	LCS for batch 1832718	105
1204182418	MB for batch 1832718	90
466294011	B3MN42	80
466294012	B3MN53	80
466294013	B3MN54	90
466294014	B3MN48	87
466294015	B3MN37	89
466294016	B3MN56	89
466294017	B3MN44	80
466294018	B3MN51	63
466294019	B3MN49	82
466294020	B3MN39	85
1204182420	B3MN42PS	83
1204182421	B3MN42PSD	73

Surrogate	Acceptance Limits
BFB = Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 29 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL32122-1, SL32143-1, SL32145-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32122-1, SL32143-1 and SL32145-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1X2	12/03/18	Soil	C	8081B
B3L1X5	12/03/18	Soil	C	8081B
B3L221	12/03/18	Soil	C	8081B
B3L1W6	12/03/18	Soil	C	8081B
B3L1X8	12/03/18	Soil	C	8081B
B3L218	12/04/18	Soil	C	8081B
B3L1W3	12/04/18	Soil	C	8081B
B3L1W9	12/04/18	Soil	C	8081B
B3L200	12/04/18	Soil	C	8081B
B3L1W0	12/04/18	Soil	C	8081B
B3L203	12/04/18	Soil	C	8081B
B3L1V4	12/04/18	Soil	C	8081B
B3L1Y1	12/04/18	Soil	C	8081B
B3L1T8	12/04/18	Soil	C	8081B
B3L224	12/04/18	Soil	C	8081B
B3L1Y7	12/04/18	Soil	C	8081B
B3L1V1	12/04/18	Soil	C	8081B
B3L1V7	12/04/18	Soil	C	8081B
B3L215	12/04/18	Soil	C	8081B
B3L1Y4	12/04/18	Soil	C	8081B
B3L209	12/04/18	Soil	C	8081B
B3L212	12/04/18	Soil	C	8081B
B3L206	12/04/18	Soil	C	8081B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG SL32143-1, sample B3L218 was extracted beyond but within 2X the holding time. All results should be qualified as estimates and flagged "UJ" for non-detects and flagged "J" for detects.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the MS recoveries for 4,4′-DDD, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone and methoxychlor were below the lower acceptance limit but ≥20%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32143-1, the MS and MSD recoveries for alpha-chlordane were above the upper acceptance limit. The alpha-chlordane result for sample B3L218 was a detect and should be qualified as estimated and flagged "J."

For SDG SL32145-1, the MS and/or MSD recoveries for endosulfan II, 4,4′-DDD, endosulfan I, endosulfan sulfate, endrin aldehyde and methoxychlor were below the lower acceptance limit but ≥20%. All associated sample results should be qualified as estimates and flagged "UJ" for non-detects and flagged "J" for detects. See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the LCS recoveries for endosulfan sulfate and endrin aldehyde were below the lower acceptance limit. The sample results for these analytes were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32143-1, the LCS recovery for endosulfan I was below the lower acceptance limit. The endosulfan I result for sample B3L218 was a non-detect and based on professional judgment should be qualified as an estimate and flagged "UJ."

It should be mentioned that LCS analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and

whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicates results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. No other pesticides CRDLs were provided.

- **Completeness**

SDG SL32122-1, SL32143-1 and SL32145-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to extraction beyond the holding time, high MS/MSD recoveries, low MS/MSD recoveries and low LCS recoveries. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDG: SL32122-1, SL32143-1, SL32145-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
All pesticides <u>except</u> 4,4′-DDE, 4,4′-DDT alpha-chlordane, endosulfan I	UJ	B3L218	Extracted beyond but within 2X the holding time
4,4′-DDE, 4,4′-DDT	J	B3L218	Extracted beyond but within 2X the holding time
alpha-chlordane	J	B3L218	Extracted beyond but within 2X the holding time and high matrix spike recoveries
endosulfan I	UJ	B3L218	Extracted beyond but within 2X the holding time and low LCS recovery
4,4′-DDD, endosulfan I, endosulfan II, endrin, endrin ketone, methoxychlor	UJ	B3L1X2, B3L1X5, B3L221, B3L1W6, B3L1X8	Low matrix spike recoveries
endosulfan sulfate, endrin aldehyde	UJ	B3L1X2, B3L1X5, B3L221, B3L1W6, B3L1X8	Low matrix spike recoveries and low LCS recoveries
endosulfan II, endosulfan I, endosulfan sulfate, methoxychlor	UJ	B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	Low matrix spike recoveries
4,4′-DDD	UJ	B3L1W3, B3L1W9, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1,	Low matrix spike recoveries

		B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	
4,4′-DDD	J	B3L200	Low matrix spike recoveries
endrin aldehyde	UJ	B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	Low matrix spike recoveries
endrin aldehyde	J	B3L1Y1	Low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/29/19	
			SDG: SL32122-1, SL32143-1, SL32145-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32122-1: B3L1X2, B3L1X5, B3L221, B3L1W6, B3L1X8					
SL32143-1: B3L218					
SL32145-1: B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A
DDT and endrin breakdowns acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	(Yes) No N/A
Surrogate recoveries acceptable?	(Yes) No N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	Yes (No) N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

MS/MSD

SL32122-1: 4,4'-DDD 68% (MS), endosulfan I 65% (MS), endosulfan II 64% (MS), endosulfan sulfate 57% (MS), endrin 68% (MS), endrin aldehyde 59% (MS), endrin ketone 65% (MS), methoxychlor 66% (MS)

SL32143-1: alpha-chlordane 144%/133%

SL32145-1: endosulfan II 69%/57%, 4,4'-DDD 65% (MSD), endosulfan I 62% (MSD), endosulfan sulfate 64% (MSD), endrin aldehyde 65% (MSD), methoxychlor 62% (MSD)

LCS

SL32122-1: endosulfan sulfate 68%, endrin aldehyde 68%

SL32143-1: endosulfan I 69%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SL32143-1: B3L218 extracted 16 days after collection.

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. No other CRDL were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-A-1-C MSD
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3640		ug/Kg	☼	102	33 - 140	2	30
Fluoranthene	54	U	3580	3050		ug/Kg	☼	85	45 - 109	0	30
Fluorene	49	U	3580	2970		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3580	3090		ug/Kg	☼	86	48 - 113	3	30
Hexachlorobutadiene	43	U	3580	2980		ug/Kg	☼	83	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3580	2580		ug/Kg	☼	72	21 - 144	2	30
Hexachloroethane	37	U	3580	2590		ug/Kg	☼	72	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	68	U	3580	3760		ug/Kg	☼	105	30 - 136	7	30
Isophorone	40	U	3580	2470		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	38	U	3580	2880		ug/Kg	☼	80	54 - 98	2	30
Nitrobenzene	43	U	3580	2740		ug/Kg	☼	76	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3580	2680		ug/Kg	☼	75	47 - 104	0	30
Pentachlorophenol	350	U	3580	2750		ug/Kg	☼	77	23 - 116	4	30
Phenanthrene	45	U	3580	3080		ug/Kg	☼	86	53 - 106	1	30
Phenol	40	U	3580	2660		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3580	3010		ug/Kg	☼	84	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*76*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404463/1-A
Matrix: Solid
Analysis Batch: 407098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404463

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-404463/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Toxaphene	23	U	67	23	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*	*12/06/18 12:48*	*12/21/18 16:38*	*1*
Tetrachloro-m-xylene	*83*		*71 - 111*	*12/06/18 12:48*	*12/21/18 16:38*	*1*

Lab Sample ID: LCS 160-404463/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	12.5		ug/Kg		75	72 - 117
4,4'-DDE	16.7	13.2		ug/Kg		79	75 - 104
4,4'-DDT	16.7	13.6		ug/Kg		82	72 - 119
Aldrin	16.7	12.7		ug/Kg		76	70 - 102
alpha-BHC	16.7	13.3		ug/Kg		80	72 - 111
alpha-Chlordane	16.7	13.0		ug/Kg		78	72 - 105
beta-BHC	16.7	12.3		ug/Kg		74	68 - 102
delta-BHC	16.7	13.5		ug/Kg		81	72 - 117
Dieldrin	16.7	13.3		ug/Kg		79	72 - 108
Endosulfan I	16.7	11.7		ug/Kg		70	34 - 96
Endosulfan II	16.7	11.9		ug/Kg		71	46 - 96
Endosulfan sulfate	16.7	11.3		ug/Kg		68	68 - 108
Endrin	16.7	12.5	o	ug/Kg		75	76 - 116
Endrin aldehyde	16.7	11.4		ug/Kg		68	54 - 97
Endrin ketone	16.7	12.5		ug/Kg		75	71 - 113
gamma-BHC (Lindane)	16.7	13.0		ug/Kg		78	71 - 107
Heptachlor	16.7	12.4		ug/Kg		74	55 - 128
Heptachlor epoxide	16.7	13.0		ug/Kg		78	72 - 107
Methoxychlor	16.7	12.6		ug/Kg		75	71 - 124
trans-Chlordane	16.7	13.1		ug/Kg		78	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*80*		*72 - 115*
Tetrachloro-m-xylene	*80*		*71 - 111*

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.6	11.9		ug/Kg	☼	68	60 - 121
4,4'-DDE	0.89	U	17.6	13.4		ug/Kg	☼	76	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32122-7 MS
Matrix: Soil
Analysis Batch: 407098

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 404463

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.66	U	17.6	13.3		ug/Kg	☼	75	59 - 122
Aldrin	0.60	U	17.6	12.6		ug/Kg	☼	72	57 - 110
alpha-BHC	0.41	U	17.6	13.3		ug/Kg	☼	75	62 - 117
alpha-Chlordane	0.99	U	17.6	12.9		ug/Kg	☼	73	58 - 114
beta-BHC	0.48	U	17.6	12.3		ug/Kg	☼	70	61 - 108
delta-BHC	0.36	U	17.6	13.5		ug/Kg	☼	77	64 - 121
Dieldrin	0.23	U	17.6	12.8		ug/Kg	☼	73	57 - 114
Endosulfan I	0.60	U	17.6	11.4		ug/Kg	☼	65	31 - 89
Endosulfan II	0.31	U	17.6	11.3		ug/Kg	☼	64	40 - 93
Endosulfan sulfate	0.36	U	17.6	10.1		ug/Kg	☼	57	56 - 112
Endrin	0.35	U o	17.6	12.1		ug/Kg	☼	68	64 - 125
Endrin aldehyde	0.41	U	17.6	10.3		ug/Kg	☼	59	45 - 101
Endrin ketone	0.44	U	17.6	11.5		ug/Kg	☼	65	59 - 115
gamma-BHC (Lindane)	0.50	U	17.6	12.9		ug/Kg	☼	73	61 - 113
Heptachlor	0.30	U	17.6	12.4		ug/Kg	☼	70	33 - 150
Heptachlor epoxide	0.50	U	17.6	12.8		ug/Kg	☼	73	60 - 114
Methoxychlor	0.87	U	17.6	11.6		ug/Kg	☼	66	58 - 130
trans-Chlordane	0.40	U	17.6	13.0		ug/Kg	☼	74	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*73*		*72 - 115*
Tetrachloro-m-xylene	*76*		*71 - 111*

Lab Sample ID: 160-32122-7 MSD
Matrix: Soil
Analysis Batch: 407098

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 404463

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.5	13.8		ug/Kg	☼	79	60 - 121	15	30
4,4'-DDE	0.89	U	17.5	15.3		ug/Kg	☼	87	63 - 111	13	30
4,4'-DDT	0.66	U	17.5	15.4		ug/Kg	☼	88	59 - 122	15	30
Aldrin	0.60	U	17.5	14.0		ug/Kg	☼	80	57 - 110	10	30
alpha-BHC	0.41	U	17.5	14.4		ug/Kg	☼	83	62 - 117	9	30
alpha-Chlordane	0.99	U	17.5	14.5		ug/Kg	☼	83	58 - 114	12	30
beta-BHC	0.48	U	17.5	13.7		ug/Kg	☼	78	61 - 108	10	30
delta-BHC	0.36	U	17.5	15.1		ug/Kg	☼	86	64 - 121	11	30
Dieldrin	0.23	U	17.5	14.5		ug/Kg	☼	83	57 - 114	12	30
Endosulfan I	0.60	U	17.5	12.8		ug/Kg	☼	73	31 - 89	11	30
Endosulfan II	0.31	U	17.5	13.0		ug/Kg	☼	74	40 - 93	14	30
Endosulfan sulfate	0.36	U	17.5	12.7		ug/Kg	☼	72	56 - 112	22	30
Endrin	0.35	U o	17.5	13.6		ug/Kg	☼	78	64 - 125	12	30
Endrin aldehyde	0.41	U	17.5	12.3		ug/Kg	☼	70	45 - 101	17	30
Endrin ketone	0.44	U	17.5	13.6		ug/Kg	☼	77	59 - 115	17	30
gamma-BHC (Lindane)	0.50	U	17.5	14.2		ug/Kg	☼	81	61 - 113	10	30
Heptachlor	0.30	U	17.5	13.8		ug/Kg	☼	79	33 - 150	11	30
Heptachlor epoxide	0.50	U	17.5	14.2		ug/Kg	☼	81	60 - 114	10	30
Methoxychlor	0.87	U	17.5	13.6		ug/Kg	☼	78	58 - 130	16	30
trans-Chlordane	0.40	U	17.5	14.7		ug/Kg	☼	84	62 - 114	12	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	91		72 - 115
Tetrachloro-m-xylene	85		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404502/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1248	11	U	33	11	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1254	13	U	33	13	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1260	10	U	33	10	ug/Kg		12/06/18 15:50	12/10/18 17:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/06/18 15:50	12/10/18 17:05	1

Lab Sample ID: LCS 160-404502/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	152		ug/Kg		91	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	176	164		ug/Kg	☼	93	23 - 140
Aroclor 1260	10	U	176	154		ug/Kg	☼	87	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	83		23 - 146

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	177	159		ug/Kg	☼	90	23 - 140	3	30
Aroclor 1260	10	U	177	150		ug/Kg	☼	85	20 - 131	3	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32124-A-1-B MS	Matrix Spike	82	85	79	75	75	91
160-32124-A-1-C MSD	Matrix Spike Duplicate	86	87	84	76	76	86
LCS 160-404561/2-A	Lab Control Sample	82	85	77	74	73	91
MB 160-404561/1-A	Method Blank	61	74	71	60	64	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32122-7	B3L1X2	87	82
160-32122-7 MS	B3L1X2	73	76
160-32122-7 MSD	B3L1X2	91	85
160-32122-8	B3L1X5	87	82
160-32122-9	B3L221	80	78
160-32122-10	B3L1W6	82	83
160-32122-11	B3L1X8	82	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404463/2-A	Lab Control Sample	80	80
MB 160-404463/1-A	Method Blank	84	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32143-3 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3L207
Prep Type: Total/NA
Prep Batch: 404663

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Butyl benzyl phthalate - DL	510	U D	3630	2840	D	ug/Kg	☼	78	54 - 112	6	30
Carbazole - DL	260	U D	3630	2610	D	ug/Kg	☼	72	47 - 102	5	30
Chrysene - DL	250	U D	3630	2630	D	ug/Kg	☼	72	45 - 115	7	30
Dibenz(a,h)anthracene - DL	360	U D	3630	3200	D	ug/Kg	☼	88	30 - 134	10	30
Dibenzofuran - DL	220	U D	3630	2680	D	ug/Kg	☼	74	50 - 102	2	30
Diethylphthalate - DL	450	U D	3630	2850	D	ug/Kg	☼	78	46 - 107	6	30
Di-n-butyl phthalate - DL	350	U D	3630	2740	D	ug/Kg	☼	75	49 - 107	9	30
Di-n-octyl phthalate - DL	730	U D	3630	3200	D	ug/Kg	☼	88	35 - 125	7	30
Diphenylamine + N-Nitrosodiphenylamine - DL	180	U D	3630	3040	D	ug/Kg	☼	84	33 - 140	10	30
Fluoranthene - DL	450	J D	3630	2850	D	ug/Kg	☼	66	45 - 109	6	30
Fluorene - DL	250	U D	3630	2690	D	ug/Kg	☼	74	45 - 109	4	30
Hexachlorobenzene - DL	230	U D	3630	2600	D	ug/Kg	☼	72	48 - 113	1	30
Hexachlorobutadiene - DL	220	U D	3630	2730	D	ug/Kg	☼	75	48 - 109	12	30
Hexachlorocyclopentadiene - DL	1800	U D	3630	2050	J D	ug/Kg	☼	56	21 - 144	8	30
Hexachloroethane - DL	190	U D	3630	2210	D	ug/Kg	☼	61	44 - 102	17	30
Indeno[1,2,3-cd]pyrene - DL	340	U D	3630	3460	D	ug/Kg	☼	95	30 - 136	6	30
Isophorone - DL	200	U D	3630	2120	D	ug/Kg	☼	58	48 - 100	7	30
Naphthalene - DL	190	U D	3630	2690	D	ug/Kg	☼	74	54 - 98	8	30
Nitrobenzene - DL	220	U D	3630	2510	D	ug/Kg	☼	69	51 - 106	2	30
N-Nitrosodi-n-propylamine - DL	220	U D	3630	2350	D	ug/Kg	☼	65	47 - 104	17	30
Pentachlorophenol - DL	1800	U D	3630	2340	J D	ug/Kg	☼	64	23 - 116	3	30
Phenanthrene - DL	230	U D	3630	2630	D	ug/Kg	☼	72	53 - 106	9	30
Phenol - DL	210	U D	3630	2440	D	ug/Kg	☼	67	41 - 100	8	30
Pyrene - DL	400	U D	3630	2570	D	ug/Kg	☼	71	39 - 130	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*61*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*74*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*68*		*44 - 120*
Phenol-d5 (Surr) - DL	*70*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*71*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-406865/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Toxaphene	23	U	67	23	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*	*12/20/18 11:36*	*12/31/18 20:13*	*1*
Tetrachloro-m-xylene	*88*		*71 - 111*	*12/20/18 11:36*	*12/31/18 20:13*	*1*

Lab Sample ID: LCS 160-406865/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.3		ug/Kg		92	72 - 117
4,4'-DDE	16.7	14.2		ug/Kg		85	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.0		ug/Kg		84	70 - 102
alpha-BHC	16.7	14.7		ug/Kg		88	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	14.1		ug/Kg		85	68 - 102
delta-BHC	16.7	15.5		ug/Kg		93	72 - 117
Dieldrin	16.7	14.7		ug/Kg		88	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		69	34 - 96
Endosulfan II	16.7	13.4		ug/Kg		80	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	14.3		ug/Kg		86	76 - 116
Endrin aldehyde	16.7	14.6		ug/Kg		87	54 - 97
Endrin ketone	16.7	15.3		ug/Kg		92	71 - 113
gamma-BHC (Lindane)	16.7	14.3		ug/Kg		86	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.3		ug/Kg		86	72 - 107
Methoxychlor	16.7	14.9		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.3		ug/Kg		86	71 - 108

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-406865/2-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32143-1 MS
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L218
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U Z	18.1	19.4		ug/Kg	☼	107	60 - 121
4,4'-DDE	1.8	Z	18.1	21.5		ug/Kg	☼	109	63 - 111
4,4'-DDT	2.3	Z	18.1	21.1		ug/Kg	☼	104	59 - 122
Aldrin	0.62	U Z	18.1	18.0		ug/Kg	☼	100	57 - 110
alpha-BHC	0.42	U Z	18.1	18.4		ug/Kg	☼	102	62 - 117
alpha-Chlordane	9.9	Z P N	18.1	35.9	N	ug/Kg	☼	144	58 - 114
beta-BHC	0.50	U Z	18.1	17.9		ug/Kg	☼	99	61 - 108
delta-BHC	0.37	U Z	18.1	20.0		ug/Kg	☼	111	64 - 121
Dieldrin	0.23	U Z	18.1	19.6		ug/Kg	☼	108	57 - 114
Endosulfan I	0.62	U Z	18.1	16.2		ug/Kg	☼	89	31 - 89
Endosulfan II	0.32	U Z N	18.1	17.5	N	ug/Kg	☼	97	40 - 93
Endosulfan sulfate	0.37	U Z	18.1	17.8		ug/Kg	☼	98	56 - 112
Endrin	0.36	U Z	18.1	18.7		ug/Kg	☼	103	64 - 125
Endrin aldehyde	0.42	U Z N	18.1	18.5	N	ug/Kg	☼	103	45 - 101
Endrin ketone	0.45	U Z	18.1	18.4		ug/Kg	☼	102	59 - 115
gamma-BHC (Lindane)	0.52	U Z	18.1	18.0		ug/Kg	☼	100	61 - 113
Heptachlor	0.31	U Z	18.1	16.6		ug/Kg	☼	92	33 - 150
Heptachlor epoxide	0.51	U Z N	18.1	21.9	N	ug/Kg	☼	121	60 - 114
Methoxychlor	0.89	U Z	18.1	16.4		ug/Kg	☼	91	58 - 130
trans-Chlordane	9.3	Z N	18.1	31.8	N	ug/Kg	☼	124	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*105*		*72 - 115*
Tetrachloro-m-xylene	*96*		*71 - 111*

Lab Sample ID: 160-32143-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L218
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U Z	18.1	19.6		ug/Kg	☼	108	60 - 121	1	30
4,4'-DDE	1.8	Z	18.1	20.4		ug/Kg	☼	103	63 - 111	5	30
4,4'-DDT	2.3	Z	18.1	22.4		ug/Kg	☼	111	59 - 122	6	30
Aldrin	0.62	U Z	18.1	16.6		ug/Kg	☼	92	57 - 110	8	30
alpha-BHC	0.42	U Z	18.1	16.9		ug/Kg	☼	94	62 - 117	8	30
alpha-Chlordane	9.9	Z P N	18.1	34.0	N	ug/Kg	☼	133	58 - 114	5	30
beta-BHC	0.50	U Z	18.1	17.1		ug/Kg	☼	94	61 - 108	4	30
delta-BHC	0.37	U Z	18.1	19.3		ug/Kg	☼	107	64 - 121	3	30
Dieldrin	0.23	U Z	18.1	18.8		ug/Kg	☼	104	57 - 114	4	30
Endosulfan I	0.62	U Z	18.1	15.6		ug/Kg	☼	86	31 - 89	4	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endosulfan II	0.32	U Z N	18.1	17.7	N	ug/Kg	☼	98	40 - 93	1	30
Endosulfan sulfate	0.37	U Z	18.1	17.7		ug/Kg	☼	98	56 - 112	0	30
Endrin	0.36	U Z	18.1	18.1		ug/Kg	☼	100	64 - 125	3	30
Endrin aldehyde	0.42	U Z N	18.1	19.1	N	ug/Kg	☼	105	45 - 101	3	30
Endrin ketone	0.45	U Z	18.1	18.5		ug/Kg	☼	102	59 - 115	0	30
gamma-BHC (Lindane)	0.52	U Z	18.1	16.9		ug/Kg	☼	93	61 - 113	6	30
Heptachlor	0.31	U Z	18.1	16.0		ug/Kg	☼	89	33 - 150	4	30
Heptachlor epoxide	0.51	U Z N	18.1	21.2	N	ug/Kg	☼	117	60 - 114	3	30
Methoxychlor	0.89	U Z	18.1	17.8		ug/Kg	☼	98	58 - 130	8	30
trans-Chlordane	9.3	Z N	18.1	30.4	N	ug/Kg	☼	116	62 - 114	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*106*		*72 - 115*
Tetrachloro-m-xylene	*87*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404897/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1248	11	U	33	11	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1254	13	U	33	13	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1260	10	U	33	10	ug/Kg		12/10/18 14:28	12/18/18 17:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*	*12/10/18 14:28*	*12/18/18 17:27*	*1*

Lab Sample ID: LCS 160-404897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	146		ug/Kg		88	52 - 134
Aroclor 1260	167	161		ug/Kg		97	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32143-1
SDG: SL32143-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32143-1	B3L218	91	75
160-32143-1 MS	B3L218	105	96
160-32143-1 MSD	B3L218	106	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32143-1	B3L218	67
160-32143-1 MS	B3L218	68
160-32143-1 MSD	B3L218	66

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-404897/2-A	Lab Control Sample	85
MB 160-404897/1-A	Method Blank	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404673/1-A
Matrix: Solid
Analysis Batch: 407382

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404673

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
Toxaphene	23	U	67	23	ug/Kg		12/07/18 16:57	12/24/18 14:00	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/07/18 16:57	12/24/18 14:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*87*		*72 - 115*	*12/07/18 16:57*	*12/24/18 14:00*	*1*
Tetrachloro-m-xylene	*90*		*71 - 111*	*12/07/18 16:57*	*12/24/18 14:00*	*1*

Lab Sample ID: LCS 160-404673/2-A
Matrix: Solid
Analysis Batch: 407382

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404673

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	13.5		ug/Kg		81	72 - 117
4,4'-DDE	16.7	14.1		ug/Kg		84	75 - 104
4,4'-DDT	16.7	14.0		ug/Kg		84	72 - 119
Aldrin	16.7	13.2		ug/Kg		79	70 - 102
alpha-BHC	16.7	13.7		ug/Kg		82	72 - 111
alpha-Chlordane	16.7	13.6		ug/Kg		82	72 - 105
beta-BHC	16.7	12.9		ug/Kg		77	68 - 102
delta-BHC	16.7	14.4		ug/Kg		86	72 - 117
Dieldrin	16.7	13.9		ug/Kg		83	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		70	34 - 96
Endosulfan II	16.7	12.0		ug/Kg		72	46 - 96
Endosulfan sulfate	16.7	12.4		ug/Kg		75	68 - 108
Endrin	16.7	13.1		ug/Kg		79	76 - 116
Endrin aldehyde	16.7	12.5		ug/Kg		75	54 - 97
Endrin ketone	16.7	13.4		ug/Kg		80	71 - 113
gamma-BHC (Lindane)	16.7	13.3		ug/Kg		80	71 - 107
Heptachlor	16.7	12.7		ug/Kg		76	55 - 128

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-404673/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407382 — **Prep Batch: 404673**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	16.7	13.5		ug/Kg		81	72 - 107
Methoxychlor	16.7	13.1		ug/Kg		79	71 - 124
trans-Chlordane	16.7	13.8		ug/Kg		83	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Lab Sample ID: 160-32145-1 MS — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407382 — **Prep Batch: 404673**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.38	U	18.4	13.9		ug/Kg	☼	76	60 - 121
4,4'-DDE	1.5	J	18.4	16.9		ug/Kg	☼	84	63 - 111
4,4'-DDT	0.69	U	18.4	16.3		ug/Kg	☼	89	59 - 122
Aldrin	0.62	U	18.4	15.7		ug/Kg	☼	85	57 - 110
alpha-BHC	0.42	U	18.4	16.9		ug/Kg	☼	92	62 - 117
alpha-Chlordane	3.8	P	18.4	19.0		ug/Kg	☼	83	58 - 114
beta-BHC	0.50	U	18.4	16.7		ug/Kg	☼	91	61 - 108
delta-BHC	0.37	U	18.4	17.0		ug/Kg	☼	92	64 - 121
Dieldrin	1.1	J	18.4	16.3		ug/Kg	☼	82	57 - 114
Endosulfan I	0.62	U	18.4	13.1		ug/Kg	☼	71	31 - 89
Endosulfan II	0.32	U	18.4	12.7		ug/Kg	☼	69	40 - 93
Endosulfan sulfate	0.37	U	18.4	13.9		ug/Kg	☼	76	56 - 112
Endrin	0.36	U	18.4	14.8		ug/Kg	☼	80	64 - 125
Endrin aldehyde	0.42	U	18.4	14.0		ug/Kg	☼	76	45 - 101
Endrin ketone	0.46	U	18.4	15.4		ug/Kg	☼	84	59 - 115
gamma-BHC (Lindane)	0.52	U	18.4	15.9		ug/Kg	☼	87	61 - 113
Heptachlor	0.31	U	18.4	15.2		ug/Kg	☼	83	33 - 150
Heptachlor epoxide	0.52	U	18.4	16.3		ug/Kg	☼	89	60 - 114
Methoxychlor	0.90	U	18.4	14.9		ug/Kg	☼	81	58 - 130
trans-Chlordane	3.9		18.4	19.1		ug/Kg	☼	82	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407382 — **Prep Batch: 404673**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.38	U	18.4	11.9		ug/Kg	☼	65	60 - 121	15	30
4,4'-DDE	1.5	J	18.4	14.9		ug/Kg	☼	73	63 - 111	12	30
4,4'-DDT	0.69	U	18.4	14.1		ug/Kg	☼	76	59 - 122	15	30
Aldrin	0.62	U	18.4	14.0		ug/Kg	☼	76	57 - 110	11	30
alpha-BHC	0.42	U	18.4	15.0		ug/Kg	☼	82	62 - 117	11	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32145-1 MSD
Matrix: Soil
Analysis Batch: 407382

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 404673

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	3.8	P	18.4	17.0		ug/Kg	☼	72	58 - 114	12	30
beta-BHC	0.50	U	18.4	15.8		ug/Kg	☼	86	61 - 108	5	30
delta-BHC	0.37	U	18.4	15.3		ug/Kg	☼	83	64 - 121	10	30
Dieldrin	1.1	J	18.4	14.3		ug/Kg	☼	72	57 - 114	13	30
Endosulfan I	0.62	U	18.4	11.3		ug/Kg	☼	62	31 - 89	14	30
Endosulfan II	0.32	U	18.4	10.5		ug/Kg	☼	57	40 - 93	19	30
Endosulfan sulfate	0.37	U	18.4	11.7		ug/Kg	☼	64	56 - 112	17	30
Endrin	0.36	U	18.4	13.0		ug/Kg	☼	70	64 - 125	13	30
Endrin aldehyde	0.42	U	18.4	12.0		ug/Kg	☼	65	45 - 101	15	30
Endrin ketone	0.46	U	18.4	12.9		ug/Kg	☼	70	59 - 115	18	30
gamma-BHC (Lindane)	0.52	U	18.4	14.6		ug/Kg	☼	79	61 - 113	9	30
Heptachlor	0.31	U	18.4	13.8		ug/Kg	☼	75	33 - 150	10	30
Heptachlor epoxide	0.52	U	18.4	14.7		ug/Kg	☼	80	60 - 114	11	30
Methoxychlor	0.90	U	18.4	11.5		ug/Kg	☼	62	58 - 130	26	30
trans-Chlordane	3.9		18.4	17.4		ug/Kg	☼	73	62 - 114	9	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*78*		*72 - 115*
Tetrachloro-m-xylene	*82*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404897/1-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404897

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1248	11	U	33	11	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1254	13	U	33	13	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1260	10	U	33	10	ug/Kg		12/10/18 14:28	12/18/18 17:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*	*12/10/18 14:28*	*12/18/18 17:27*	*1*

Lab Sample ID: LCS 160-404897/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404897

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	146		ug/Kg		88	52 - 134
Aroclor 1260	167	161		ug/Kg		97	50 - 132

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32145-1
SDG: SL32145-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32145-1	B3L1W3	74	85
160-32145-1 MS	B3L1W3	86	89
160-32145-1 MSD	B3L1W3	78	82
160-32145-2	B3L1W9	83	85
160-32145-17	B3L206	89	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32145-3	B3L200	86	87
160-32145-4	B3L1W0	109	93
160-32145-5	B3L203	79	88
160-32145-6	B3L1V4	86	81
160-32145-7	B3L1Y1	85	82
160-32145-8	B3L1T8	77	78
160-32145-9	B3L224	79	85
160-32145-10	B3L1Y7	82	89
160-32145-11	B3L1V1	88	90
160-32145-12	B3L1V7	96	84
160-32145-13	B3L215	94	89
160-32145-14	B3L1Y4	89	85
160-32145-15	B3L209	93	91
160-32145-16	B3L212	84	82

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404673/2-A	Lab Control Sample	84	85
MB 160-404673/1-A	Method Blank	87	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL32122-1, SL32143-1, SL32145-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32122-1, SL32143-1 and SL32145-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1X2	12/03/18	Soil	C	8082A
B3L1X5	12/03/18	Soil	C	8082A
B3L221	12/03/18	Soil	C	8082A
B3L1W6	12/03/18	Soil	C	8082A
B3L1X8	12/03/18	Soil	C	8082A
B3L218	12/04/18	Soil	C	8082A
B3L1W3	12/04/18	Soil	C	8082A
B3L1W9	12/04/18	Soil	C	8082A
B3L200	12/04/18	Soil	C	8082A
B3L1W0	12/04/18	Soil	C	8082A
B3L203	12/04/18	Soil	C	8082A
B3L1V4	12/04/18	Soil	C	8082A
B3L1Y1	12/04/18	Soil	C	8082A
B3L1T8	12/04/18	Soil	C	8082A
B3L224	12/04/18	Soil	C	8082A
B3L1Y7	12/04/18	Soil	C	8082A
B3L1V1	12/04/18	Soil	C	8082A
B3L1V7	12/04/18	Soil	C	8082A
B3L215	12/04/18	Soil	C	8082A
B3L1Y4	12/04/18	Soil	C	8082A
B3L209	12/04/18	Soil	C	8082A
B3L212	12/04/18	Soil	C	8082A
B3L206	12/04/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL32122-1, the decachlorobiphenyl surrogate recovery for sample B3L1X8 was below the lower acceptance limit but ≥10%. All sample results were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32143-1, the decachlorobiphenyl surrogate recoveries for samples B3L218, B3L318MS and B3L218MSD were below the lower acceptance limit but ≥10%. All results for sample B3L218 were non-detects and should be qualified as estimates and flagged "UJ." Since samples B3L218MS and B3L218MSD were QC samples, data should not be qualified as a result.

For SDG SL32145-1, the decachlorobiphenyl surrogate recoveries for samples B3L1W3, B3L1W3MS, B3L1W3MSD, B3L1W9, B3L203, B3L1V4, B3L1Y1, B3L224, B3L1Y7 and B3L206 were below the lower acceptance limit but ≥10%. All results for these samples were non-detects and should be qualified as estimates and flagged "UJ." Since samples B3L1W3MS and B3L1W3MSD were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. It should be noted that method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. It should be noted that method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicates results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for aroclor-1016, aroclor-1254 and aroclor-1260 were met. CRDLs for other PCBs analytes were not provided in the SAP.

- **Completeness**

SDGs SL32122-1, SL32143-1 and SL32145-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL32122-1, SL32143-1, SL32145-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Aroclor-1016, -1221, -1232, -1242, -1248, -1254 & -1260	UJ	B3L1X8, B3L218, B3L1W3, B3L1W9, B3L203, B3L1V4, B3L1Y1, B3L224, B3L1Y7, B3L206	Low surrogate recoveries.

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/28/19	
			SDG: SL32122-1, SL32143-1, SL32145-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32122-1: B3L1X2, B3L1X5, B3L221. B3L1W6, B3L1X8					
SL32143-1: B3L218					
SL32145-1: B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	(Yes) No N/A
Surrogate recoveries acceptable?	Yes (No) N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	(Yes) No N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

Surrogate

SL32122-1: DCB1 B3L1X8 65%

SL32143-1: DCB1 B3L218 67%, B3L218MS 68%, B3L218MSD 66%

SL32145-1: DCB1 B3L1W3 62%, B3L1W3MS 60%, B3L1W3MSD 57%; B3L1W9 63%, B3L203 63%, B3L1V4, 64%, B3L1Y1 69%, B3L224 65%, B3L1Y7 65%, B3L206 69%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for aroclor 1016, aroclor 1254, and aroclor 1260 were met, no other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	91		72 - 115
Tetrachloro-m-xylene	85		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404502/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1248	11	U	33	11	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1254	13	U	33	13	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1260	10	U	33	10	ug/Kg		12/06/18 15:50	12/10/18 17:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/06/18 15:50	12/10/18 17:05	1

Lab Sample ID: LCS 160-404502/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	152		ug/Kg		91	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	176	164		ug/Kg	☼	93	23 - 140
Aroclor 1260	10	U	176	154		ug/Kg	☼	87	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	83		23 - 146

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	177	159		ug/Kg	☼	90	23 - 140	3	30
Aroclor 1260	10	U	177	150		ug/Kg	☼	85	20 - 131	3	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.6	U D N	18.7	9.39	B D N	mg/Kg	☼	50	75 - 125
Lithium	7.1	B D	9.35	16.76	D	mg/Kg	☼	103	75 - 125

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.6	U D N	18.1	10.02	B D N	mg/Kg	☼	56	75 - 125	6	30
Lithium	7.1	B D	9.03	16.99	D	mg/Kg	☼	110	75 - 125	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
160-32122-7	B3L1X2	82							
160-32122-7 MS	B3L1X2	83							
160-32122-7 MSD	B3L1X2	81							
160-32122-8	B3L1X5	72							
160-32122-9	B3L221	81							
160-32122-10	B3L1W6	73							
160-32122-11	B3L1X8	65							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
LCS 160-404502/2-A	Lab Control Sample	81							
MB 160-404502/1-A	Method Blank	89							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32143-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L218
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endosulfan II	0.32	U Z N	18.1	17.7	N	ug/Kg	☼	98	40 - 93	1	30
Endosulfan sulfate	0.37	U Z	18.1	17.7		ug/Kg	☼	98	56 - 112	0	30
Endrin	0.36	U Z	18.1	18.1		ug/Kg	☼	100	64 - 125	3	30
Endrin aldehyde	0.42	U Z N	18.1	19.1	N	ug/Kg	☼	105	45 - 101	3	30
Endrin ketone	0.45	U Z	18.1	18.5		ug/Kg	☼	102	59 - 115	0	30
gamma-BHC (Lindane)	0.52	U Z	18.1	16.9		ug/Kg	☼	93	61 - 113	6	30
Heptachlor	0.31	U Z	18.1	16.0		ug/Kg	☼	89	33 - 150	4	30
Heptachlor epoxide	0.51	U Z N	18.1	21.2	N	ug/Kg	☼	117	60 - 114	3	30
Methoxychlor	0.89	U Z	18.1	17.8		ug/Kg	☼	98	58 - 130	8	30
trans-Chlordane	9.3	Z N	18.1	30.4	N	ug/Kg	☼	116	62 - 114	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*106*		*72 - 115*
Tetrachloro-m-xylene	*87*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404897/1-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404897

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1248	11	U	33	11	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1254	13	U	33	13	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1260	10	U	33	10	ug/Kg		12/10/18 14:28	12/18/18 17:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*	*12/10/18 14:28*	*12/18/18 17:27*	*1*

Lab Sample ID: LCS 160-404897/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404897

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aroclor 1016			167	146		ug/Kg		88	52 - 134		
Aroclor 1260			167	161		ug/Kg		97	50 - 132		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	159		ug/Kg	☼	88	23 - 140
Aroclor 1260	11	U	181	147		ug/Kg	☼	81	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*68*		*23 - 146*

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	180	151		ug/Kg	☼	84	23 - 140	5	30
Aroclor 1260	11	U	180	149		ug/Kg	☼	83	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*66*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.2	U D N	20.4	7.95	B D N	mg/Kg	☼	39	75 - 125

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32143-1
SDG: SL32143-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32143-1	B3L218	91	75
160-32143-1 MS	B3L218	105	96
160-32143-1 MSD	B3L218	106	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32143-1	B3L218	67
160-32143-1 MS	B3L218	68
160-32143-1 MSD	B3L218	66

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-404897/2-A	Lab Control Sample	85
MB 160-404897/1-A	Method Blank	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407382 — **Prep Batch: 404673**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	3.8	P	18.4	17.0		ug/Kg	☼	72	58 - 114	12	30
beta-BHC	0.50	U	18.4	15.8		ug/Kg	☼	86	61 - 108	5	30
delta-BHC	0.37	U	18.4	15.3		ug/Kg	☼	83	64 - 121	10	30
Dieldrin	1.1	J	18.4	14.3		ug/Kg	☼	72	57 - 114	13	30
Endosulfan I	0.62	U	18.4	11.3		ug/Kg	☼	62	31 - 89	14	30
Endosulfan II	0.32	U	18.4	10.5		ug/Kg	☼	57	40 - 93	19	30
Endosulfan sulfate	0.37	U	18.4	11.7		ug/Kg	☼	64	56 - 112	17	30
Endrin	0.36	U	18.4	13.0		ug/Kg	☼	70	64 - 125	13	30
Endrin aldehyde	0.42	U	18.4	12.0		ug/Kg	☼	65	45 - 101	15	30
Endrin ketone	0.46	U	18.4	12.9		ug/Kg	☼	70	59 - 115	18	30
gamma-BHC (Lindane)	0.52	U	18.4	14.6		ug/Kg	☼	79	61 - 113	9	30
Heptachlor	0.31	U	18.4	13.8		ug/Kg	☼	75	33 - 150	10	30
Heptachlor epoxide	0.52	U	18.4	14.7		ug/Kg	☼	80	60 - 114	11	30
Methoxychlor	0.90	U	18.4	11.5		ug/Kg	☼	62	58 - 130	26	30
trans-Chlordane	3.9		18.4	17.4		ug/Kg	☼	73	62 - 114	9	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*78*		*72 - 115*
Tetrachloro-m-xylene	*82*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404897/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1248	11	U	33	11	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1254	13	U	33	13	ug/Kg		12/10/18 14:28	12/18/18 17:27	1
Aroclor 1260	10	U	33	10	ug/Kg		12/10/18 14:28	12/18/18 17:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*	*12/10/18 14:28*	*12/18/18 17:27*	*1*

Lab Sample ID: LCS 160-404897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	146		ug/Kg		88	52 - 134
Aroclor 1260	167	161		ug/Kg		97	50 - 132

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-404897/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404897

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Lab Sample ID: 160-32145-1 MS
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 404897

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	11	U	183	166		ug/Kg	☼	91	23 - 140
Aroclor 1260	11	U	183	148		ug/Kg	☼	81	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*60*		*23 - 146*

Lab Sample ID: 160-32145-1 MSD
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 404897

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	11	U	184	149		ug/Kg	☼	81	23 - 140	11	30
Aroclor 1260	11	U	184	144		ug/Kg	☼	79	20 - 131	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*57*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406148/1-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406148

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:05	12/27/18 10:55	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:05	12/27/18 10:55	1

Lab Sample ID: LCS 160-406148/2-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406148

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.24	10.21		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406148/3-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406148

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	84.76	B D	mg/Kg		92.5	53.5 - 124.5

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32145-1
SDG: SL32145-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**						
160-32145-1	B3L1W3	62						
160-32145-1 MS	B3L1W3	60						
160-32145-1 MSD	B3L1W3	57						
160-32145-2	B3L1W9	63						
160-32145-3	B3L200	70						
160-32145-4	B3L1W0	74						
160-32145-5	B3L203	63						
160-32145-6	B3L1V4	64						
160-32145-7	B3L1Y1	69						
160-32145-8	B3L1T8	75						
160-32145-9	B3L224	65						
160-32145-10	B3L1Y7	65						
160-32145-11	B3L1V1	78						
160-32145-12	B3L1V7	73						
160-32145-13	B3L215	78						
160-32145-14	B3L1Y4	71						
160-32145-15	B3L209	76						
160-32145-16	B3L212	76						
160-32145-17	B3L206	69						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**						
LCS 160-404897/2-A	Lab Control Sample	85						
MB 160-404897/1-A	Method Blank	91						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL466073, GEL466240, GEL466294

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL466073, GEL466240 and GEL466294 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1W5	12/03/18	Soil	C	8151A
B3L1X1	12/03/18	Soil	C	8151A
B3L1X4	12/03/18	Soil	C	8151A
B3L1X7	12/03/18	Soil	C	8151A
B3L220	12/03/18	Soil	C	8151A
B3L1Y6	12/04/18	Soil	C	8151A
B3L202	12/04/18	Soil	C	8151A
B3L1V6	12/04/18	Soil	C	8151A
B3L223	12/04/18	Soil	C	8151A
B3L1V9	12/04/18	Soil	C	8151A
B3L211	12/04/18	Soil	C	8151A
B3L217	12/04/18	Soil	C	8151A
B3L1V0	12/04/18	Soil	C	8151A
B3L1V3	12/04/18	Soil	C	8151A
B3L1W2	12/04/18	Soil	C	8151A
B3L205	12/04/18	Soil	C	8151A
B3L208	12/04/18	Soil	C	8151A
B3L1T7	12/04/18	Soil	C	8151A
B3L1Y0	12/04/18	Soil	C	8151A
B3L1W8	12/04/18	Soil	C	8151A
B3L1Y9	12/04/18	Soil	C	8151A
B3L1Y3	12/04/18	Soil	C	8151A
B3L214	12/04/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

SDG GEL466073, the 2,4-dichlorophenylacetic acid surrogate recovery for sample B3M413MSD on the primary column was above the upper acceptance limit. The sample was a QC sample and data should not be qualified as a result.

SDG GEL466240:
The 2,4-dichlorophenylacetic acid surrogate recoveries for sample B3L1Y6 on both columns were below the lower acceptance limit but ≥ 10%. All sample results were non-detects and should be qualified as estimates and flagged "UJ."

The 2,4-dichlorophenylacetic acid surrogate recoveries for sample B3L202 on both columns and for sample B3M413MSD on the primary column were above the upper acceptance limit. All results for sample B3L202 were non-detects and since sample B3M413MSD was a QC sample, data should not be qualified as a result.

For SDG GEL466294, the 2,4-dichlorophenylacetic acid surrogate recoveries for samples B3L1W2MS and B3L1W2MSD were above the upper acceptance limit. Since the samples were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG GEL466073
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS recovery for MCPA was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

SDG GEL466240
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS recovery for MCPA was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

SDG GEL466294
The MS and MSD recoveries for dinoseb were <20%. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MSD recovery for 2,4-DB was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS recoveries for dichlorprop and MCPP were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

SDG GEL466073, the LCS recoveries for dalapon and dinoseb were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment all dalapon sample results should be qualified as estimates and flagged "UJ." All associated dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

SDG GEL466240, the LCS recoveries for dalapon and dinoseb were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment all dalapon sample results should be qualified as estimates and flagged "UJ." All associated dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

SDG GEL466294, the LCS recovery for 2,4-DB was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exceptions.

For SDG GEL466073, the RPD for dinoseb was above the upper acceptance limit. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recovery. See the table in Appendix 2 for a listing of affected samples

For SDG GEL466240, the RPD for dinoseb was above the upper acceptance limit. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recovery. See the table in Appendix 2 for a listing of affected samples

Field Duplicate Samples

All field duplicates results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL466073, GEL466240 and GEL466294 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 90%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of all dinoseb sample results as unusable were due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recoveries, low matrix spike recoveries, low LCS recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Herbicide Data Qualification Summary			
SDGs: GEL466073, GEL466240, GEL466294	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dicamba, dichlorprop, MCPP	UJ	B3L1Y6	Low surrogate recovery
dalapon	UJ	B3L1Y6	Low surrogate recovery and low LCS recovery
dinoseb	UR	B3L1Y6	Low surrogate recovery, very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
MCPA	UJ	B3L1Y6	Low surrogate recovery and low matrix spike recoveries
dinoseb	UR	B3L1W5, B3L1X1, B3L1X4, B3L1X7, B3L220, B3L202, B3L1V6, B3L223, B3L1V9, B3L211, B3L217, B3L1V0,	Very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
dinoseb	UR	B3L1V3, B3L1W2, B3L205, B3L208, B3L1T7, B3L1Y0, B3L1W8, B3L1Y9, B3L1Y3, B3L214	Very low matrix spike recoveries
MCPA	UJ	B3L1W5, B3L1X1, B3L1X4, B3L1X7, B3L220, B3L202, B3L1V6, B3L223, B3L1V9, B3L211, B3L217, B3L1V0	Low matrix spike recoveries
dalapon	UJ	B3L1W5, B3L1X1, B3L1X4, B3L1X7, B3L220, B3L202, B3L1V6, B3L223, B3L1V9, B3L211,	Low LCS recovery

		B3L217, B3L1V0	
2,4-DB	UJ	B3L1V3, B3L1W2, B3L205, B3L208, B3L1T7, B3L1Y0, B3L1W8, B3L1Y9, B3L1Y3, B3L214	Low matrix spike recoveries and low LCS recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/28/19	
			SDG: GEL466073, GEL466240, GEL466294		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	

SAMPLES/MATRIX: Soil

GEL466073: B3L1W5, B3L1X1, BL31X4, B3L1X7, B3L220

GEL466240: B3L1Y6, B3L202, B3L1V6, B3L223, B3L1V9, B3L211, B3L217, B3L1V0

GEL466294: B3L1V3, B3L1W2, B3L205, B3L208, B3L1T7, B3L1Y0, B3L1W8, B3L1Y9, B3L1Y3, B3L214

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

GEL466073: B3M413MSD DCAA1 153%;

GEL466240: B3M413MSD DCAA1 153%; B3L1Y6 30%/39%; B3L202 174%/228%;

GEL466294: B3L1W2MS DCAA1 677%, B3L1W2MSD DCAA1 610%

MS/MSD

GEL466073: dinoseb 6%/11%, MCPA 69% (MS),

GEL466240: dinoseb 6%/11%, MCPA 69% (MS),

GEL466294: dichlorprop 131% (MS), dinoseb 0%/0%, MCPP 144% (MS), 2,4-DB 63% (MSD)

LCS

GEL466073: dalapon 65%, dinoseb 0%

GEL466240: dalapon 65%, dinoseb 0%

GEL466294: 2,4-DB 66%,

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL466073: RPDs dinoseb 59%

GEL466240: RPDs dinoseb 59%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL466073

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204177436	MB for batch 1830383	69	79
1204177437	LCS for batch 1830383	128	119
1204177438	B3M413MS	126	119
1204177440	B3M413MSD	153 *	113
466073001	B3L1W5	86	113
466073002	B3L1X1	88	117
466073003	B3L1X4	97	114
466073004	B3L1X7	84	113
466073005	B3L220	89	115

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 30, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466073**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
QC1204177437 LCS											
2,4,5-T	39.9			41.3	ug/kg		104	(60%-139%)	LOF	12/13/18	16:44
2,4,5-TP	39.9			42.2	ug/kg		106	(62%-140%)			
2,4-D	39.9			39.0	ug/kg		98	(55%-140%)			
2,4-DB	39.9			42.2	ug/kg		106	(51%-152%)			
Dalapon	399			261	ug/kg		65	(32%-110%)			
Dicamba	39.9			39.4	ug/kg		99	(53%-135%)			
Dichlorprop	39.9			37.7	ug/kg		94	(52%-136%)			
Dinoseb	39.9		U	1.65	ug/kg		0 *	(24%-104%)			
MCPA	3990			3110	ug/kg		78	(44%-142%)			
MCPP	3990			3480	ug/kg		87	(39%-138%)			
**2,4-Dichlorophenylacetic acid	99.7			119	ug/kg		119	(37%-149%)			
QC1204177436 MB											
2,4,5-T			U	1.65	ug/kg					12/13/18	16:24
2,4,5-TP			U	1.65	ug/kg						

QC Summary

Workorder: **466073**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1830390												
2,4-D				U	1.65	ug/kg				LOF	12/13/18	16:24
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.4				68.8	ug/kg		69	(37%-149%)			
QC1204177438 466068001 MS												
2,4,5-T	42.8	U	1.79		44.3	ug/kg		103	(39%-144%)		12/13/18	18:47
2,4,5-TP	42.8	U	1.79		46.1	ug/kg		108	(40%-146%)			
2,4-D	42.8	U	1.79		40.5	ug/kg		95	(40%-149%)			
2,4-DB	42.8	U	1.79		43.3	ug/kg		101	(29%-160%)			
Dalapon	428	U	37.7		310	ug/kg		72	(19%-132%)			
Dicamba	42.8	U	2.15		44.1	ug/kg		103	(46%-135%)			

QC Summary

Workorder: **466073**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830390											
Dichlorprop	42.8	U	2.43		38.7	ug/kg		90	(38%-145%)	LOF	12/13/18 18:47
Dinoseb	42.8	TU	1.79	JT	2.51	ug/kg		6*	(20%-118%)		
MCPA	4280	U	248		2970	ug/kg		69	(29%-154%)		
MCPP	4280	U	215		3950	ug/kg		92	(30%-135%)		
**2,4-Dichlorophenylacetic acid	107		92.9		135	ug/kg		126	(37%-149%)		
QC1204177440 466068001 MSD											
2,4,5-T	43.0	U	1.79		41.1	ug/kg	8	96	(0%-30%)		12/13/18 19:15
2,4,5-TP	43.0	U	1.79		41.2	ug/kg	11	96	(0%-30%)		
2,4-D	43.0	U	1.79		36.5	ug/kg	10	85	(0%-30%)		
2,4-DB	43.0	U	1.79		38.9	ug/kg	11	91	(0%-30%)		
Dalapon	430	U	37.7		266	ug/kg	15	62	(0%-30%)		
Dicamba	43.0	U	2.15		41.3	ug/kg	6	96	(0%-30%)		
Dichlorprop	43.0	U	2.43		53.9	ug/kg	33*	125	(0%-30%)		
Dinoseb	43.0	TU	1.79	JT	4.62	ug/kg	59*	11*	(0%-30%)		
MCPA	4300	U	248		3280	ug/kg	10	76	(0%-30%)		
MCPP	4300	U	215		4390	ug/kg	10	102	(0%-30%)		

QC Summary

Workorder: **466073**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
**2,4-Dichlorophenylacetic acid	107	92.9		164	ug/kg		153*	(37%-149%)	LOF	12/13/18	19:15

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL466240

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204177436	MB for batch 1830383	69	79
1204177437	LCS for batch 1830383	128	119
1204177438	B3M413MS	126	119
1204177440	B3M413MSD	153 *	113
466240001	B3L1Y6	30 *	39
466240002	B3L202	174 *	228 *
466240003	B3L1V6	90	111
466240004	B3L223	97	118
466240005	B3L1V9	85	108
466240006	B3L211	101	128
466240007	B3L217	82	105
466240008	B3L1V0	98	122

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 30, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
QC1204177437 LCS											
2,4,5-T	39.9			41.3	ug/kg		104	(60%-139%)	LOF	12/13/18	16:44
2,4,5-TP	39.9			42.2	ug/kg		106	(62%-140%)			
2,4-D	39.9			39.0	ug/kg		98	(55%-140%)			
2,4-DB	39.9			42.2	ug/kg		106	(51%-152%)			
Dalapon	399			261	ug/kg		65	(32%-110%)			
Dicamba	39.9			39.4	ug/kg		99	(53%-135%)			
Dichlorprop	39.9			37.7	ug/kg		94	(52%-136%)			
Dinoseb	39.9		U	1.65	ug/kg		0 *	(24%-104%)			
MCPA	3990			3110	ug/kg		78	(44%-142%)			
MCPP	3990			3480	ug/kg		87	(39%-138%)			
**2,4-Dichlorophenylacetic acid	99.7			119	ug/kg		119	(37%-149%)			
QC1204177436 MB											
2,4,5-T			U	1.65	ug/kg					12/13/18	16:24
2,4,5-TP			U	1.65	ug/kg						

QC Summary

Workorder: **466240**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1830390												
2,4-D				U	1.65	ug/kg				LOF	12/13/18	16:24
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.4				68.8	ug/kg		69	(37%-149%)			
QC1204177438 466068001 MS												
2,4,5-T	42.8	U	1.79		44.3	ug/kg		103	(39%-144%)		12/13/18	18:47
2,4,5-TP	42.8	U	1.79		46.1	ug/kg		108	(40%-146%)			
2,4-D	42.8	U	1.79		40.5	ug/kg		95	(40%-149%)			
2,4-DB	42.8	U	1.79		43.3	ug/kg		101	(29%-160%)			
Dalapon	428	U	37.7		310	ug/kg		72	(19%-132%)			
Dicamba	42.8	U	2.15		44.1	ug/kg		103	(46%-135%)			

QC Summary

Workorder: **466240**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830390											
Dichlorprop	42.8	U	2.43		38.7	ug/kg		90	(38%-145%)	LOF	12/13/18 18:47
Dinoseb	42.8	TU	1.79	JT	2.51	ug/kg		6*	(20%-118%)		
MCPA	4280	U	248		2970	ug/kg		69	(29%-154%)		
MCPP	4280	U	215		3950	ug/kg		92	(30%-135%)		
**2,4-Dichlorophenylacetic acid	107		92.9		135	ug/kg		126	(37%-149%)		
QC1204177440 466068001 MSD											
2,4,5-T	43.0	U	1.79		41.1	ug/kg	8	96	(0%-30%)		12/13/18 19:15
2,4,5-TP	43.0	U	1.79		41.2	ug/kg	11	96	(0%-30%)		
2,4-D	43.0	U	1.79		36.5	ug/kg	10	85	(0%-30%)		
2,4-DB	43.0	U	1.79		38.9	ug/kg	11	91	(0%-30%)		
Dalapon	430	U	37.7		266	ug/kg	15	62	(0%-30%)		
Dicamba	43.0	U	2.15		41.3	ug/kg	6	96	(0%-30%)		
Dichlorprop	43.0	U	2.43		53.9	ug/kg	33*	125	(0%-30%)		
Dinoseb	43.0	TU	1.79	JT	4.62	ug/kg	59*	11*	(0%-30%)		
MCPA	4300	U	248		3280	ug/kg	10	76	(0%-30%)		
MCPP	4300	U	215		4390	ug/kg	10	102	(0%-30%)		

QC Summary

Workorder: **466240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
**2,4-Dichlorophenylacetic acid	107	92.9		164	ug/kg		153*	(37%-149%)	LOF	12/13/18	19:15

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL466294

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204179356	MB for batch 1831323	110	113
1204179357	LCS for batch 1831323	83	81
466294001	B3L1V3	85	107
466294002	B3L1W2	87	81
1204179976	B3L1W2MS	677 *	118
1204179977	B3L1W2MSD	610 *	108
466294003	B3L205	105	115
466294004	B3L208	100	95
466294005	B3L1T7	103	110
466294006	B3L1Y0	118	133
466294007	B3L1W8	110	116
466294008	B3L1Y9	98	115
466294009	B3L1Y3	107	130
466294010	B3L214	119	130

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 19, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466294**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1831324										
QC1204179357 LCS										
2,4,5-T	39.9			33.1	ug/kg		83	(60%-139%)	LXA1	12/16/18 16:47
2,4,5-TP	39.9			34.7	ug/kg		87	(62%-140%)		
2,4-D	39.9			32.9	ug/kg		83	(55%-140%)		
2,4-DB	39.9			26.5	ug/kg		66	(51%-152%)		
Dalapon	399			314	ug/kg		79	(32%-110%)		
Dicamba	39.9			33.8	ug/kg		85	(53%-135%)		
Dichlorprop	39.9			30.4	ug/kg		76	(52%-136%)		
Dinoseb	39.9			46.1	ug/kg		116*	(24%-104%)		
MCPA	3990			3110	ug/kg		78	(44%-142%)		
MCPP	3990			2910	ug/kg		73	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			80.7	ug/kg		81	(37%-149%)		
QC1204179356 MB										
2,4,5-T			U	1.65	ug/kg					12/16/18 16:28
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466294**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831324											
2,4-D				U	1.65	ug/kg				LXA1	12/16/18 16:28
2,4-DB				U	1.65	ug/kg					
Dalapon				U	34.9	ug/kg					
Dicamba				U	1.99	ug/kg					
Dichlorprop				U	2.25	ug/kg					
Dinoseb				U	1.65	ug/kg					
MCPA				U	229	ug/kg					
MCPP				U	199	ug/kg					
**2,4-Dichlorophenylacetic acid	99.7				110	ug/kg		110	(37%-149%)		
QC1204179976 466294002 MS											
2,4,5-T	43.9	U	1.83		37.2	ug/kg		85	(39%-144%)		12/17/18 17:58
2,4,5-TP	43.9	U	1.83		38.6	ug/kg		88	(40%-146%)		
2,4-D	43.9	U	1.83		39.7	ug/kg		90	(40%-149%)		
2,4-DB	43.9	U	1.83	P	33.9	ug/kg		77	(29%-160%)		
Dalapon	439	U	38.6		390	ug/kg		89	(19%-132%)		
Dicamba	43.9	U	2.21		43.6	ug/kg		99	(46%-135%)		

QC Summary

Workorder: **466294**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831324											
Dichlorprop	43.9	U	2.49		57.7	ug/kg		131	(38%-145%)	LXA1	12/17/18 17:58
Dinoseb	43.9	TU	1.83	TU	1.82	ug/kg		0*	(20%-118%)		
MCPA	4390	U	254		4860	ug/kg		111	(29%-154%)		
MCPP	4390	TU	221	T	6340	ug/kg		144*	(30%-135%)		
**2,4-Dichlorophenylacetic acid	110		89.4		130	ug/kg		118	(37%-149%)		
QC1204179977 466294002 MSD											
2,4,5-T	44.0	U	1.83		33.4	ug/kg	11	76	(0%-30%)		12/17/18 18:17
2,4,5-TP	44.0	U	1.83		34.6	ug/kg	11	79	(0%-30%)		
2,4-D	44.0	U	1.83	P	34.8	ug/kg	13	79	(0%-30%)		
2,4-DB	44.0	U	1.83	P	27.6	ug/kg	21	63	(0%-30%)		
Dalapon	440	U	38.6		351	ug/kg	10	80	(0%-30%)		
Dicamba	44.0	U	2.21		39.4	ug/kg	10	90	(0%-30%)		
Dichlorprop	44.0	U	2.49		51.6	ug/kg	11	117	(0%-30%)		
Dinoseb	44.0	TU	1.83	TU	1.82	ug/kg	N/A	0*	(0%-30%)		
MCPA	4400	U	254		4230	ug/kg	14	96	(0%-30%)		
MCPP	4400	TU	221		5210	ug/kg	20	118	(0%-30%)		

QC Summary

Workorder: **466294**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1831324											
**2,4-Dichlorophenylacetic acid	110	89.4		119	ug/kg		108	(37%-149%)	LXA1	12/17/18	18:17

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Groups (SDGs) SL32122-1, SL32143-1, SL32145-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32122-1, SL32143-1 and SL32145-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1X2	12/03/18	Soil	C	6010D, 6020B, 7471B
B3L1X5	12/03/18	Soil	C	6010D, 6020B, 7471B
B3L221	12/03/18	Soil	C	6010D, 6020B, 7471B
B3L1W6	12/03/18	Soil	C	6010D, 6020B, 7471B
B3L1X8	12/03/18	Soil	C	6010D, 6020B, 7471B
B3L218	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1W3	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1W9	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L200	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1W0	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L203	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1V4	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1Y1	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1T8	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L224	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1Y7	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1V1	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1V7	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L215	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L1Y4	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L209	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L212	12/04/18	Soil	C	6010D, 6020B, 7471B
B3L206	12/04/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG SL32122-1, the MB results for Pb and Hg were detects ≥ the method detection limit (MDL) but ≤ the practical quantitation limit (PQL). All associated Pb sample results were detects ≥20X the blank value and should not be qualified as a result. The Hg results for samples B3L1X5, B3L221, B3L1W6 and B3L1X8 were detects > the MDL but ≤ the PQL and should be qualified as estimates and flagged "J+." The Hg result for sample B3L1X2 was a non-detect and should not be qualified as a result.

For SDG SL32143-1, the MB result for Pb was a detect ≥ the MDL but ≤ the PQL. The Pb result for sample B3L218 was a detect ≥ 20X the blank value and should not be qualified as a result.

For SDG SL32145-1, the MB result for Sn was a detect > the MDL but ≤ the PQL. All associated sample results were either detects ≥ the MDL but ≤ the PQL or detects > the PQL but <20X the MB result, and therefore should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected samples.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG SL32122-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al were above the upper acceptance limit. The Al parent sample result was >4X the spike concentration and should not be qualified as a result.

SDG SL32143-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. The B result for sample B3L218 was a non-detect and should be qualified as estimated and flagged "UJ."

The MS and/or MSD recoveries for Al, Mn and Ba were above the upper acceptance limit. The Mn and Ba results for sample B3L218 were detects and should be qualified as estimates and flagged "J+." The Al parent sample result was >4X the spike concentration and should not be qualified as a result.

SDG SL32145-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit. All associated Mn sample results were detects and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected samples. The Al parent sample result was >4X the spike concentration and data should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicates results were acceptable with the following exceptions.

For SDG SL32122-1, sample B3L1W6/duplicate sample B3L221 had a 50% RPD for Pb and a 38% RPD for Zn.

For SDG SL2145-1 – sample B3L1Y4/duplicate sample B3L224 had a 47% RPD for As.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

- **Completeness**

SDGs SL32122-1, SL32143-1 and SL32145-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to laboratory blank and matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Metals Data Qualification Summary			
SDGs: SL32122-1, SL32143-1, SL32145-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Hg	J+	B3L1X5, B3L221, B3L1W6, B3L1X8	Laboratory blank infraction
Sn	J+	B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	Laboratory blank infraction
B	UJ	B3L1X2, B3L1X5, B3L221, B3L1W6, B3L1X8, B3L218, B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	Low matrix spike recoveries
Ba	J+	B3L218	High matrix spike recovery
Mn	J+	B3L218, B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212, B3L206	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-017		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE:	
			SDG: SL32122-1, SL32143-1, SL32145-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SL32122-1: B3L1X2, B3L1X5, B3L221, B3L1W6, B3L1X8					
SL32143-1: B3L218					
SL32145-1: B3L1W3, B3L1W9, B3L200, B3L1W0, B3L203, B3L1V4, B3L1Y1, B3L1T8, B3L224, B3L1Y7, B3L1V1, B3L1V7, B3L215, B3L1Y4, B3L209, B3L212. B3L206					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SL32122-1: MB Pb 0.177 mg/kg; Hg 0.0161 mg/kg

SL32143-1: MB Pb 0.177 mg/kg

SL32145-1: MB Sn 0.112 mg/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL32122-1: B 50%/56%, Al 248%/190%, (Al parent result >4X spike)

SL32143-1: B 39%/36%, Al 302%/288%, Mn 147%/164%, Ba 132% (MSD) (Al parent result >4X spike)

SL32145-1: B 33%/35%, Al 246%/273%, Mn 194%/190% (Al parent result >4X spike)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

SL32122-1: B3L1W6/B3L221 Pb 50%; Zn 38%

SL32145-1: B3L1Y4/B3L224: As 47%;

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No N/A
ICP serial dilution %D values acceptable?	Yes No N/A
ICP post digestion spike required?	Yes No N/A
ICP post digestion spike values acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.6	U D N	18.7	9.39	B D N	mg/Kg	☼	50	75 - 125
Lithium	7.1	B D	9.35	16.76	D	mg/Kg	☼	103	75 - 125

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.6	U D N	18.1	10.02	B D N	mg/Kg	☼	56	75 - 125	6	30
Lithium	7.1	B D	9.03	16.99	D	mg/Kg	☼	110	75 - 125	1	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406142/1-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406142

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Arsenic	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Beryllium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Chromium	0.44	U D	0.99	0.44	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Copper	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Lead	0.177	B D	0.30	0.12	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Selenium	0.32	U D	0.49	0.32	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Tin	0.089	U D	0.20	0.089	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Uranium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Vanadium	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2

Lab Sample ID: LCS 160-406142/2-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	91.6	94.61	D	mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-406142/3-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8457	D	mg/Kg		101.2	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	288.0	D	mg/Kg		110.8	75.0 - 125.0
Beryllium	97.6	115.1	D	mg/Kg		117.9	75.0 - 125.0
Cadmium	211	230.7	D	mg/Kg		109.3	74.9 - 125.1
Chromium	136	155.1	D	mg/Kg		114.1	70.0 - 130.1
Cobalt	48.2	57.12	D	mg/Kg		118.5	74.9 - 124.9
Copper	166	190.9	D	mg/Kg		115.0	74.7 - 124.7
Lead	111	127.8	D	mg/Kg		115.1	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406142/3-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	253.6	D	mg/Kg		88.1	57.3 - 101.0
Molybdenum	110	130.1	D	mg/Kg		118.3	70.5 - 129.1
Nickel	91.9	107.6	D	mg/Kg		117.1	70.0 - 129.5
Selenium	191	224.5	D	mg/Kg		117.5	68.6 - 131.9
Silver	43.3	48.89	D	mg/Kg		112.9	69.5 - 130.5
Strontium	107	126.0	D	mg/Kg		117.7	72.1 - 128.0
Tin	99.9	117.7	D	mg/Kg		117.9	56.8 - 143.1
Vanadium	56.7	68.94	D	mg/Kg		121.6	56.8 - 143.4
Zinc	199	227.9	D	mg/Kg		114.5	69.8 - 130.2

Lab Sample ID: 160-32122-7 MS
Matrix: Soil
Analysis Batch: 406946

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5780	D	935	8107	D X	mg/Kg	☼	248	75 - 125
Arsenic	2.8	D	93.5	87.21	D	mg/Kg	☼	90	75 - 125
Barium	58.3	D N	93.5	179.2	D N	mg/Kg	☼	129	75 - 125
Beryllium	0.27	D N	9.35	12.17	D N	mg/Kg	☼	127	75 - 125
Cadmium	0.12	D	93.5	102.8	D	mg/Kg	☼	110	75 - 125
Chromium	12.0	D	93.5	94.07	D	mg/Kg	☼	88	75 - 125
Cobalt	6.7	D	93.5	93.19	D	mg/Kg	☼	92	75 - 125
Copper	13.7	D	93.5	98.71	D	mg/Kg	☼	91	75 - 125
Lead	5.0	D	93.5	110.1	D	mg/Kg	☼	112	75 - 125
Manganese	271	D	93.5	367.9	D	mg/Kg	☼	104	75 - 125
Molybdenum	0.37	B D	46.8	54.23	D	mg/Kg	☼	115	75 - 125
Nickel	11.8	D	93.5	99.50	D	mg/Kg	☼	94	75 - 125
Selenium	1.4	D	46.8	40.73	D	mg/Kg	☼	84	75 - 125
Silver	0.070	U D	18.7	20.40	D	mg/Kg	☼	109	75 - 125
Strontium	33.6	D	93.5	149.1	D	mg/Kg	☼	123	75 - 125
Tin	0.35	D	93.5	105.6	D	mg/Kg	☼	113	75 - 125
Uranium	0.46	D	93.5	108.2	D	mg/Kg	☼	115	75 - 125
Vanadium	43.1	D	93.5	128.5	D	mg/Kg	☼	91	75 - 125
Zinc	39.3	D	93.5	119.8	D	mg/Kg	☼	86	75 - 125

Lab Sample ID: 160-32122-7 MSD
Matrix: Soil
Analysis Batch: 406946

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5780	D	903	7498	D X	mg/Kg	☼	190	75 - 125	8	30
Arsenic	2.8	D	90.3	87.90	D	mg/Kg	☼	94	75 - 125	1	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	58.3	D N	90.3	154.9	D	mg/Kg	☼	107	75 - 125	15	30
Beryllium	0.27	D N	9.03	10.06	D	mg/Kg	☼	108	75 - 125	19	30
Cadmium	0.12	D	90.3	88.94	D	mg/Kg	☼	98	75 - 125	14	30
Chromium	12.0	D	90.3	89.38	D	mg/Kg	☼	86	75 - 125	5	30
Cobalt	6.7	D	90.3	94.63	D	mg/Kg	☼	97	75 - 125	2	30
Copper	13.7	D	90.3	125.8	D	mg/Kg	☼	124	75 - 125	24	30
Lead	5.0	D	90.3	97.17	D	mg/Kg	☼	102	75 - 125	12	30
Manganese	271	D	90.3	369.6	D	mg/Kg	☼	109	75 - 125	0	30
Molybdenum	0.37	B D	45.1	47.76	D	mg/Kg	☼	105	75 - 125	13	30
Nickel	11.8	D	90.3	99.05	D	mg/Kg	☼	97	75 - 125	0	30
Selenium	1.4	D	45.1	42.82	D	mg/Kg	☼	92	75 - 125	5	30
Silver	0.070	U D	18.1	17.56	D	mg/Kg	☼	97	75 - 125	15	30
Strontium	33.6	D	90.3	132.0	D	mg/Kg	☼	109	75 - 125	12	30
Tin	0.35	D	90.3	91.28	D	mg/Kg	☼	101	75 - 125	15	30
Uranium	0.46	D	90.3	94.49	D	mg/Kg	☼	104	75 - 125	13	30
Vanadium	43.1	D	90.3	120.7	D	mg/Kg	☼	86	75 - 125	6	30
Zinc	39.3	D	90.3	121.8	D	mg/Kg	☼	91	75 - 125	2	30

Lab Sample ID: MB 160-406145/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.17	U D	0.42	0.17	mg/Kg		12/17/18 10:59	12/26/18 14:30	2

Lab Sample ID: LCS 160-406145/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	45.5	45.53	D	mg/Kg		100	21 - 251

Lab Sample ID: 160-32122-7 MS — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.47	U D	51.9	48.65	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-32122-7 MSD — **Client Sample ID: B3L1X2**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.47	U D	48.7	46.71	D	mg/Kg	☼	96	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32122-1
SDG: SL32122-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406420/1-A
Matrix: Solid
Analysis Batch: 406517

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406420

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0161	B	0.035	0.012	mg/Kg		12/18/18 12:51	12/18/18 17:33	1

Lab Sample ID: LCSSRM 160-406420/2-A ^10
Matrix: Solid
Analysis Batch: 406517

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406420

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	11.61	D	mg/Kg		101.0	59.7 - 139.1		

Lab Sample ID: 160-32122-7 MS
Matrix: Soil
Analysis Batch: 406517

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 406420

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	0.962	1.05		mg/Kg	☼	109	80 - 120		

Lab Sample ID: 160-32122-7 MSD
Matrix: Soil
Analysis Batch: 406517

Client Sample ID: B3L1X2
Prep Type: Total/NA
Prep Batch: 406420

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.00	1.10		mg/Kg	☼	110	80 - 120	5	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	159		ug/Kg	☼	88	23 - 140
Aroclor 1260	11	U	181	147		ug/Kg	☼	81	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*68*		*23 - 146*

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	180	151		ug/Kg	☼	84	23 - 140	5	30
Aroclor 1260	11	U	180	149		ug/Kg	☼	83	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*66*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.2	U D N	20.4	7.95	B D N	mg/Kg	☼	39	75 - 125

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	7.1	B D	10.2	17.64	D	mg/Kg	☼	103	75 - 125

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.2	U D N	20.1	7.19	B D N	mg/Kg	☼	36	75 - 125	10	30
Lithium	7.1	B D	10.0	16.79	D	mg/Kg	☼	97	75 - 125	5	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406142/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Arsenic	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Beryllium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Chromium	0.44	U D	0.99	0.44	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Copper	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Lead	0.177	B D	0.30	0.12	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Selenium	0.32	U D	0.49	0.32	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Tin	0.089	U D	0.20	0.089	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Uranium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Vanadium	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2

Lab Sample ID: LCS 160-406142/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	91.6	94.61	D	mg/Kg		103	80 - 120

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406142/3-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8457	D	mg/Kg		101.2	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	288.0	D	mg/Kg		110.8	75.0 - 125.0
Beryllium	97.6	115.1	D	mg/Kg		117.9	75.0 - 125.0
Cadmium	211	230.7	D	mg/Kg		109.3	74.9 - 125.1
Chromium	136	155.1	D	mg/Kg		114.1	70.0 - 130.1
Cobalt	48.2	57.12	D	mg/Kg		118.5	74.9 - 124.9
Copper	166	190.9	D	mg/Kg		115.0	74.7 - 124.7
Lead	111	127.8	D	mg/Kg		115.1	71.0 - 128.8
Manganese	288	253.6	D	mg/Kg		88.1	57.3 - 101.0
Molybdenum	110	130.1	D	mg/Kg		118.3	70.5 - 129.1
Nickel	91.9	107.6	D	mg/Kg		117.1	70.0 - 129.5
Selenium	191	224.5	D	mg/Kg		117.5	68.6 - 131.9
Silver	43.3	48.89	D	mg/Kg		112.9	69.5 - 130.5
Strontium	107	126.0	D	mg/Kg		117.7	72.1 - 128.0
Tin	99.9	117.7	D	mg/Kg		117.9	56.8 - 143.1
Vanadium	56.7	68.94	D	mg/Kg		121.6	56.8 - 143.4
Zinc	199	227.9	D	mg/Kg		114.5	69.8 - 130.2

Lab Sample ID: 160-32143-1 MS
Matrix: Soil
Analysis Batch: 406946

Client Sample ID: B3L218
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6190	D	1020	9278	D X	mg/Kg	☼	302	75 - 125
Arsenic	3.0	D	102	101.7	D	mg/Kg	☼	97	75 - 125
Barium	73.7	D N	102	201.5	D	mg/Kg	☼	125	75 - 125
Beryllium	0.31	D	10.2	11.64	D	mg/Kg	☼	111	75 - 125
Cadmium	0.091	D	102	98.84	D	mg/Kg	☼	97	75 - 125
Chromium	10.9	D	102	100.7	D	mg/Kg	☼	88	75 - 125
Cobalt	8.2	D	102	108.9	D	mg/Kg	☼	99	75 - 125
Copper	13.0	D	102	109.5	D	mg/Kg	☼	94	75 - 125
Lead	6.5	D	102	107.4	D	mg/Kg	☼	99	75 - 125
Manganese	331	D N	102	481.9	D N	mg/Kg	☼	147	75 - 125
Molybdenum	0.37	B D	51.1	52.29	D	mg/Kg	☼	102	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	11.4	D	102	110.7	D	mg/Kg	☼	97	75 - 125
Selenium	2.0	D	51.1	48.65	D	mg/Kg	☼	91	75 - 125
Silver	0.078	U D	20.4	19.66	D	mg/Kg	☼	96	75 - 125
Strontium	20.4	D	102	136.6	D	mg/Kg	☼	114	75 - 125
Tin	0.53	D	102	101.0	D	mg/Kg	☼	98	75 - 125
Uranium	0.43	D	102	104.1	D	mg/Kg	☼	101	75 - 125
Vanadium	58.5	D	102	156.7	D	mg/Kg	☼	96	75 - 125
Zinc	48.8	D	102	146.7	D	mg/Kg	☼	96	75 - 125

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6190	D	1000	9081	D X	mg/Kg	☼	288	75 - 125	2	30
Arsenic	3.0	D	100	99.38	D	mg/Kg	☼	96	75 - 125	2	30
Barium	73.7	D N	100	205.9	D N	mg/Kg	☼	132	75 - 125	2	30
Beryllium	0.31	D	10.0	12.25	D	mg/Kg	☼	119	75 - 125	5	30
Cadmium	0.091	D	100	104.5	D	mg/Kg	☼	104	75 - 125	6	30
Chromium	10.9	D	100	98.12	D	mg/Kg	☼	87	75 - 125	3	30
Cobalt	8.2	D	100	107.6	D	mg/Kg	☼	99	75 - 125	1	30
Copper	13.0	D	100	110.2	D	mg/Kg	☼	97	75 - 125	1	30
Lead	6.5	D	100	114.9	D	mg/Kg	☼	108	75 - 125	7	30
Manganese	331	D N	100	495.8	D N	mg/Kg	☼	164	75 - 125	3	30
Molybdenum	0.37	B D	50.2	55.03	D	mg/Kg	☼	109	75 - 125	5	30
Nickel	11.4	D	100	109.7	D	mg/Kg	☼	98	75 - 125	1	30
Selenium	2.0	D	50.2	48.04	D	mg/Kg	☼	92	75 - 125	1	30
Silver	0.078	U D	20.1	20.72	D	mg/Kg	☼	103	75 - 125	5	30
Strontium	20.4	D	100	140.5	D	mg/Kg	☼	120	75 - 125	3	30
Tin	0.53	D	100	107.7	D	mg/Kg	☼	107	75 - 125	6	30
Uranium	0.43	D	100	110.2	D	mg/Kg	☼	109	75 - 125	6	30
Vanadium	58.5	D	100	156.3	D	mg/Kg	☼	97	75 - 125	0	30
Zinc	48.8	D	100	146.3	D	mg/Kg	☼	97	75 - 125	0	30

Lab Sample ID: MB 160-406145/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.17	U D	0.42	0.17	mg/Kg		12/17/18 10:59	12/26/18 14:30	2

Lab Sample ID: LCS 160-406145/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	45.5	45.53	D	mg/Kg		100	21 - 251

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.51	U D	50.5	48.49	D	mg/Kg	☼	96	75 - 125

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.51	U D	54.0	50.58	D	mg/Kg	☼	94	75 - 125	4	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406446/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/18/18 14:44	12/19/18 08:52	1

Lab Sample ID: LCSSRM 160-406446/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.65	D	mg/Kg		92.6	59.7 - 139.1

Lab Sample ID: 160-32143-1 MS — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	1.03	1.03		mg/Kg	☼	101	80 - 120

Lab Sample ID: 160-32143-1 MSD — **Client Sample ID: B3L218**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.06	1.08		mg/Kg	☼	102	80 - 120	5	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-404897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	85		23 - 146

Lab Sample ID: 160-32145-1 MS — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	11	U	183	166		ug/Kg	☼	91	23 - 140
Aroclor 1260	11	U	183	148		ug/Kg	☼	81	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	60		23 - 146

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406501 — **Prep Batch: 404897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	11	U	184	149		ug/Kg	☼	81	23 - 140	11	30
Aroclor 1260	11	U	184	144		ug/Kg	☼	79	20 - 131	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	57		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406148/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406148**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:05	12/27/18 10:55	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:05	12/27/18 10:55	1

Lab Sample ID: LCS 160-406148/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406148**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.24	10.21		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406148/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406148**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	84.76	B D	mg/Kg		92.5	53.5 - 124.5

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-045

TestAmerica Job ID: 160-32145-1
SDG: SL32145-1

Lab Sample ID: 160-32145-1 MS
Matrix: Soil
Analysis Batch: 407765

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 406148

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.5	U N D	18.4	6.12	B N D	mg/Kg	☼	33	75 - 125
Lithium	8.4	B D	9.22	18.43	D	mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-32145-1 MSD
Matrix: Soil
Analysis Batch: 407765

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 406148

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.5	U N D	19.3	6.77	B D N	mg/Kg	☼	35	75 - 125	10	30
Lithium	8.4	B D	9.64	18.54	D	mg/Kg	☼	106	75 - 125	1	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406146/1-A
Matrix: Solid
Analysis Batch: 407355

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406146

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.7	U D	4.3	1.7	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Arsenic	0.35	U D	0.87	0.35	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Barium	0.43	U D	1.7	0.43	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Beryllium	0.035	U D	0.087	0.035	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Cadmium	0.021	U D	0.043	0.021	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Chromium	0.39	U D	0.87	0.39	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Cobalt	0.065	U D	0.17	0.065	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Copper	0.35	U D	0.87	0.35	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Lead	0.11	U D	0.26	0.11	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Manganese	0.17	U D	0.43	0.17	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Molybdenum	0.17	U D	0.43	0.17	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Nickel	0.17	U D	0.43	0.17	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Selenium	0.28	U D	0.43	0.28	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Silver	0.065	U D	0.17	0.065	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Strontium	0.21	U D	0.43	0.21	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Tin	0.112	B D	0.17	0.078	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Uranium	0.035	U D	0.087	0.035	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Vanadium	0.35	U D	0.87	0.35	mg/Kg		12/17/18 11:01	12/21/18 17:45	2
Zinc	1.7	U D	4.3	1.7	mg/Kg		12/17/18 11:01	12/21/18 17:45	2

Lab Sample ID: LCS 160-406146/2-A
Matrix: Solid
Analysis Batch: 407355

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406146

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	92.4	93.09	D	mg/Kg		101	80 - 120

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406146/3-A
Matrix: Solid
Analysis Batch: 407355

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406146

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8188	D	mg/Kg		97.9	50.2 - 149.5
Arsenic	161	177.7	D	mg/Kg		110.4	70.2 - 129.8
Barium	260	265.5	D	mg/Kg		102.1	75.0 - 125.0
Beryllium	97.6	100.4	D	mg/Kg		102.9	75.0 - 125.0
Cadmium	211	209.1	D	mg/Kg		99.1	74.9 - 125.1
Chromium	136	145.0	D	mg/Kg		106.6	70.0 - 130.1
Cobalt	48.2	54.55	D	mg/Kg		113.2	74.9 - 124.9
Copper	166	185.6	D	mg/Kg		111.8	74.7 - 124.7
Lead	111	113.3	D	mg/Kg		102.1	71.0 - 128.8
Manganese	288	241.2	D	mg/Kg		83.8	57.3 - 101.0
Molybdenum	110	114.6	D	mg/Kg		104.2	70.5 - 129.1
Nickel	91.9	102.9	D	mg/Kg		112.0	70.0 - 129.5
Selenium	191	213.9	D	mg/Kg		112.0	68.6 - 131.9
Silver	43.3	43.33	D	mg/Kg		100.1	69.5 - 130.5
Strontium	107	113.4	D	mg/Kg		106.0	72.1 - 128.0
Tin	99.9	103.8	D	mg/Kg		103.9	56.8 - 143.1
Vanadium	56.7	64.37	D	mg/Kg		113.5	56.8 - 143.4
Zinc	199	218.5	D	mg/Kg		109.8	69.8 - 130.2

Lab Sample ID: 160-32145-1 MS
Matrix: Soil
Analysis Batch: 407355

Client Sample ID: B3L1W3
Prep Type: Total/NA
Prep Batch: 406146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6230	D	922	8493	D X	mg/Kg	☼	246	75 - 125
Arsenic	2.9	D	92.2	92.78	D	mg/Kg	☼	97	75 - 125
Barium	74.6	D	92.2	186.1	D	mg/Kg	☼	121	75 - 125
Beryllium	0.31	D	9.22	10.13	D	mg/Kg	☼	106	75 - 125
Cadmium	0.14	D	92.2	90.58	D	mg/Kg	☼	98	75 - 125
Chromium	10.7	D	92.2	89.01	D	mg/Kg	☼	85	75 - 125
Cobalt	8.8	D	92.2	100.4	D	mg/Kg	☼	99	75 - 125
Copper	22.8	D	92.2	112.7	D	mg/Kg	☼	98	75 - 125
Lead	9.5	D	92.2	97.75	D	mg/Kg	☼	96	75 - 125
Manganese	332	D N	92.2	511.7	D N	mg/Kg	☼	194	75 - 125
Molybdenum	0.46	B D	46.1	45.79	D	mg/Kg	☼	98	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32145-1 MS — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407355 — **Prep Batch: 406146**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	10.8	D	92.2	101.5	D	mg/Kg	☼	98	75 - 125
Selenium	2.2	D	46.1	44.10	D	mg/Kg	☼	91	75 - 125
Silver	0.087	B D	18.4	17.91	D	mg/Kg	☼	97	75 - 125
Strontium	27.5	D	92.2	129.2	D	mg/Kg	☼	110	75 - 125
Tin	0.87	D C	92.2	93.08	D	mg/Kg	☼	100	75 - 125
Uranium	2.0	D	92.2	94.73	D	mg/Kg	☼	101	75 - 125
Vanadium	60.3	D	92.2	143.0	D	mg/Kg	☼	90	75 - 125
Zinc	73.9	D	92.2	166.6	D	mg/Kg	☼	101	75 - 125

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407355 — **Prep Batch: 406146**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6230	D	964	8862	D X	mg/Kg	☼	273	75 - 125	4	30
Arsenic	2.9	D	96.4	98.36	D	mg/Kg	☼	99	75 - 125	6	30
Barium	74.6	D	96.4	184.9	D	mg/Kg	☼	114	75 - 125	1	30
Beryllium	0.31	D	9.64	10.47	D	mg/Kg	☼	105	75 - 125	3	30
Cadmium	0.14	D	96.4	92.84	D	mg/Kg	☼	96	75 - 125	2	30
Chromium	10.7	D	96.4	96.11	D	mg/Kg	☼	89	75 - 125	8	30
Cobalt	8.8	D	96.4	106.6	D	mg/Kg	☼	101	75 - 125	6	30
Copper	22.8	D	96.4	118.1	D	mg/Kg	☼	99	75 - 125	5	30
Lead	9.5	D	96.4	102.0	D	mg/Kg	☼	96	75 - 125	4	30
Manganese	332	D N	96.4	515.6	D N	mg/Kg	☼	190	75 - 125	1	30
Molybdenum	0.46	B D	48.2	48.21	D	mg/Kg	☼	99	75 - 125	5	30
Nickel	10.8	D	96.4	109.2	D	mg/Kg	☼	102	75 - 125	7	30
Selenium	2.2	D	48.2	47.98	D	mg/Kg	☼	95	75 - 125	8	30
Silver	0.087	B D	19.3	18.49	D	mg/Kg	☼	95	75 - 125	3	30
Strontium	27.5	D	96.4	129.9	D	mg/Kg	☼	106	75 - 125	1	30
Tin	0.87	D C	96.4	96.90	D	mg/Kg	☼	100	75 - 125	4	30
Uranium	2.0	D	96.4	98.51	D	mg/Kg	☼	100	75 - 125	4	30
Vanadium	60.3	D	96.4	155.8	D	mg/Kg	☼	99	75 - 125	9	30
Zinc	73.9	D	96.4	171.9	D	mg/Kg	☼	102	75 - 125	3	30

Lab Sample ID: MB 160-406149/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407774 — **Prep Batch: 406149**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.47	0.19	mg/Kg		12/17/18 11:06	12/27/18 20:47	2

Lab Sample ID: LCS 160-406149/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407774 — **Prep Batch: 406149**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.9	41.64	D	mg/Kg		97	21 - 251

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32145-1 MS — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407774 — **Prep Batch: 406149**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.49	U D	53.7	53.73	D	mg/Kg	☼	100	75 - 125

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407774 — **Prep Batch: 406149**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.49	U D	49.3	48.32	D	mg/Kg	☼	98	75 - 125	11	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406446/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/18/18 14:44	12/19/18 08:52	1

Lab Sample ID: LCSSRM 160-406446/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.65	D	mg/Kg		92.6	59.7 - 139.1

Lab Sample ID: 160-32145-1 MS — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.12		1.03	1.10		mg/Kg	☼	95	80 - 120

Lab Sample ID: 160-32145-1 MSD — **Client Sample ID: B3L1W3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406541 — **Prep Batch: 406446**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.12		1.03	1.17		mg/Kg	☼	103	80 - 120	7	30

Lab Sample ID: MB 160-406521/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406748 — **Prep Batch: 406521**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.011	U	0.034	0.011	mg/Kg		12/19/18 07:35	12/19/18 12:53	1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: LCSSRM 160-406521/2-A ^10
Matrix: Solid
Analysis Batch: 406748

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406521

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	10.58	D	mg/Kg		92.0	59.7 - 139.1		

Lab Sample ID: 160-32145-12 MS
Matrix: Soil
Analysis Batch: 406748

Client Sample ID: B3L1V7
Prep Type: Total/NA
Prep Batch: 406521

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.028	B	1.04	1.06		mg/Kg	☼	100	80 - 120		

Lab Sample ID: 160-32145-12 MSD
Matrix: Soil
Analysis Batch: 406748

Client Sample ID: B3L1V7
Prep Type: Total/NA
Prep Batch: 406521

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.028	B	1.02	1.02		mg/Kg	☼	97	80 - 120	5	30

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8868-1, RL8903-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8868-1 and RL8903-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L267	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L279	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L266	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L268	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L264	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L263	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L275	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L262	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L277	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L276	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L258	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L269	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L274	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L272	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L273	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L261	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L265	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L259	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L278	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L271	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L260	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L270	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L280	12/04/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil/solid analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception.

For SDG RL8903-1, the LCS recovery for Pu-241 was above the upper acceptance limit. All associated sample results were <the MDCs and should not be qualified as a result.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided.

- **Completeness**

SDGs RL8868-1 and RL8903-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8868-1, RL8903-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	(C)	D	E

Project: RTL	Data Package: VSR19-017
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/28/19
	SDG: RL8868-1, RL8903-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241		

Samples/Matrix Soil

RL8868-1: B3L267, B3L279, B3L266, B3L268, B3L264

RL8903-1: B3L263, B3L275, B3L262, B3L277, B3L276, B3L258, B3L269, B3L274, B3L272, B3L273, B3L261, B3L265, B3L259, B3L278, B3L271, B3L260, B3L270, B3L280,

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	(Yes) No N/A
Method blank results acceptable?	(Yes) No N/A
Analytes detected in method blank?	Yes (No) N/A
Field blank(s) analyzed?	Yes (No) N/A
Field blank results acceptable?	Yes No (N/A)
Analytes detected in field blank(s)?	Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E)	Yes No (N/A)

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	(Yes) No N/A
LCS/BSS recoveries acceptable?	Yes (No) N/A
LCS/BSS traceable? (Levels D,E)	Yes No (N/A)
LCS/BSS expired? (Levels D,E)	Yes No (N/A)
LCS/BSS levels correct? (Levels D,E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

RL8903-1: %R, Pu-241 143%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☒ N/A
Chemical carrier added?	Yes No N/A
Chemical recovery acceptable?	Yes No N/A
Chemical carrier traceable? (Levels D, E)	Yes No N/A
Chemical carrier expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	Yes No N/A
Tracer recovery acceptable?	Yes No N/A
Tracer traceable? (Levels D, E)	Yes No N/A
Tracer expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No N/A
Spike recoveries acceptable?	Yes No N/A
Spike source traceable? (Levels D, E)	Yes No N/A
Spike source expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	Yes No N/A
RPD values acceptable?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

RPDs >30% - sample results were < the MDCs or differences <2X the MDC

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split sample(s) analyzed?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	Yes No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	Yes No N/A
Results supported in raw data?(Levels D, E)	Yes No N/A
Results acceptable? (Levels D, E)	Yes No N/A
MDC's meet required reporting limits?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8868-1	B3L267	99.5
300-8868-1 DU	B3L267	103
300-8868-2	B3L279	96.0
300-8868-3	B3L266	71.5
300-8868-4	B3L268	91.7
300-8868-5	B3L264	90.7
LCS 300-16650/2-A	Lab Control Sample	97.9
MB 300-16650/1-A	Method Blank	88.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8868-1	B3L267	70.3
300-8868-1 DU	B3L267	84.3
300-8868-2	B3L279	81.2
300-8868-3	B3L266	65.7
300-8868-4	B3L268	69.4
300-8868-5	B3L264	78.2
LCS 300-16670/2-B	Lab Control Sample	77.8
MB 300-16670/1-A	Method Blank	77.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8868-1	B3L267	99.5
300-8868-1 DU	B3L267	103
300-8868-2	B3L279	96.0
300-8868-3	B3L266	71.5
300-8868-4	B3L268	91.7
300-8868-5	B3L264	90.7
LCS 300-16669/2-A	Lab Control Sample	97.9
MB 300-16669/1-A	Method Blank	88.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16472/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0184	U		0.0684	0.370	0.0605	pCi/g	12/07/18 14:07	12/19/18 10:30	1

Lab Sample ID: LCS 300-16472/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.619		0.201	0.370	0.0906	pCi/g	100	80 - 120		

Lab Sample ID: 300-8868-1 DU — **Client Sample ID: B3L267**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16859 — **Prep Batch: 16472**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.031	U		-0.0419	U	0.106	0.370	0.0828	pCi/g			28	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16670/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16964 — **Prep Batch: 16670**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.000	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1
U-233/234	-0.000655	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1
U-235/236	-0.000655	U	0.0328	0.0328	1.00	0.0601	pCi/g	12/14/18 16:09	12/26/18 10:10	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*77.1*		*30 - 105*	*12/14/18 16:09*	*12/26/18 10:10*	*1*

Lab Sample ID: LCS 300-16670/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16964 — **Prep Batch: 16670**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.07	2.720		0.583	1.00	0.0762	pCi/g	88	80 - 120		
U-233/234			2.94	2.765		0.590	1.00	0.0671	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*77.8*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8868-1 DU
Matrix: Solid
Analysis Batch: 16964

Client Sample ID: B3L267
Prep Type: Total/NA
Prep Batch: 16670

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.171			0.0838	y	0.0707	1.00	0.0559	pCi/g			68	30
U-233/234	0.171			0.0697	y	0.0643	1.00	0.0559	pCi/g			84	30
U-235/236	-0.00068	U		0.0113	U y	0.0285	1.00	0.0637	pCi/g			226	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*84.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16650/1-A
Matrix: Solid
Analysis Batch: 16863

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16650

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00432	U	0.0362	0.0362	1.00	0.0836	pCi/g	12/14/18 09:28	12/20/18 10:35	1
Pu-239/240	-0.00432	U	0.0362	0.0362	1.00	0.0836	pCi/g	12/14/18 09:28	12/20/18 10:35	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*88.7*		*30 - 105*	*12/14/18 09:28*	*12/20/18 10:35*	*1*

Lab Sample ID: LCS 300-16650/2-A
Matrix: Solid
Analysis Batch: 16863

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16650

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.06	3.567		0.688	1.00	0.0748	pCi/g	88	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.9*		*30 - 105*

Lab Sample ID: 300-8868-1 DU
Matrix: Solid
Analysis Batch: 16863

Client Sample ID: B3L267
Prep Type: Total/NA
Prep Batch: 16650

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0030	U		-0.000567	U y	0.0284	1.00	0.0537	pCi/g			137	30
Pu-239/240	-0.0045	U		-0.00170	U y	0.0284	1.00	0.0608	pCi/g			91	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*103*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8868-1
SDG: RL8868-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16669/1-A
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16669

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.189	U	0.0935	1.79	15.0	3.39	pCi/g	12/14/18 15:49	12/24/18 16:23	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*88.7*			*12/14/18 15:49*	*12/24/18 16:23*	*1*

Lab Sample ID: LCS 300-16669/2-A
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16669

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			195	182.4		12.4	15.0	2.71	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*97.9*		

Lab Sample ID: 300-8868-1 DU
Matrix: Solid
Analysis Batch: 17204

Client Sample ID: B3L267
Prep Type: Total/NA
Prep Batch: 16669

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.606	U		0.773	U	1.49	15.0	2.72	pCi/g			24	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*103*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8903-1	B3L263	62.4
300-8903-1 DU	B3L263	61.9
300-8903-2	B3L275	57.4
300-8903-3	B3L262	97.6
300-8903-4	B3L277	98.3
300-8903-5	B3L276	86.0
300-8903-6	B3L258	88.5
300-8903-7	B3L269	91.2
300-8903-8	B3L274	77.7
300-8903-9	B3L272	95.5
300-8903-10	B3L273	95.2
300-8903-11	B3L261	85.6
300-8903-12	B3L265	102
300-8903-13	B3L259	80.3
300-8903-14	B3L278	71.1
300-8903-15	B3L271	104
300-8903-16	B3L260	87.6
300-8903-17	B3L270	102
300-8903-18	B3L280	88.8
LCS 300-16677/2-A	Lab Control Sample	70.7
MB 300-16677/1-A	Method Blank	70.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8903-1	B3L263	91.0
300-8903-1 DU	B3L263	86.3
300-8903-2	B3L275	76.0
300-8903-3	B3L262	69.3
300-8903-4	B3L277	74.0
300-8903-5	B3L276	91.8
300-8903-6	B3L258	77.5
300-8903-7	B3L269	50.2
300-8903-8	B3L274	75.3
300-8903-9	B3L272	83.8
300-8903-10	B3L273	50.1
300-8903-11	B3L261	76.3
300-8903-12	B3L265	81.6
300-8903-13	B3L259	88.9
300-8903-14	B3L278	86.6
300-8903-15	B3L271	65.4
300-8903-16	B3L260	41.7
300-8903-17	B3L270	80.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**U-232(T) (30-105)**
300-8903-18	B3L280	83.7
LCS 300-16678/2-A	Lab Control Sample	77.8
MB 300-16678/1-A	Method Blank	65.0

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**Pu-242 (T)**
300-8903-1	B3L263	62.4
300-8903-1 DU	B3L263	61.9
300-8903-2	B3L275	57.4
300-8903-3	B3L262	97.6
300-8903-4	B3L277	98.3
300-8903-5	B3L276	86.0
300-8903-6	B3L258	88.5
300-8903-7	B3L269	91.2
300-8903-8	B3L274	77.7
300-8903-9	B3L272	95.5
300-8903-10	B3L273	95.2
300-8903-11	B3L261	85.6
300-8903-12	B3L265	102
300-8903-13	B3L259	80.3
300-8903-14	B3L278	71.1
300-8903-15	B3L271	104
300-8903-16	B3L260	87.6
300-8903-17	B3L270	106
300-8903-18	B3L280	88.8
LCS 300-16679/2-A	Lab Control Sample	70.7
MB 300-16679/1-A	Method Blank	70.6

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16675/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00208	U		0.0650	0.370	0.0581	pCi/g	12/15/18 06:00	12/20/18 11:23	1

Lab Sample ID: LCS 300-16675/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.411		0.189	0.370	0.105	pCi/g	92	80 - 120		

Lab Sample ID: 300-8903-1 DU — **Client Sample ID: B3L263**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16944 — **Prep Batch: 16675**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	0.0436	U		0.0553	U	0.0672	0.370	0.0965	pCi/g			24	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16678/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17004 — **Prep Batch: 16678**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00429	U	0.0308	0.0308	1.00	0.0732	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-233/234	0.0104	U	0.0308	0.0309	1.00	0.0750	pCi/g	12/15/18 09:07	12/27/18 08:42	1
U-235/236	-0.000613	U	0.0307	0.0307	1.00	0.0562	pCi/g	12/15/18 09:07	12/27/18 08:42	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*65.0*		*30 - 105*	*12/15/18 09:07*	*12/27/18 08:42*	*1*

Lab Sample ID: LCS 300-16678/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17004 — **Prep Batch: 16678**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.26	2.682		0.586	1.00	0.0735	pCi/g	82	80 - 120		
U-233/234			3.11	2.879		0.619	1.00	0.0697	pCi/g	92	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*77.8*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8903-1 DU
Matrix: Solid
Analysis Batch: 17004

Client Sample ID: B3L263
Prep Type: Total/NA
Prep Batch: 16678

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0662			0.0895		0.0629	1.00	0.0475	pCi/g			30	30
U-233/234	0.0838	U		0.0482	U y	0.0463	1.00	0.0488	pCi/g			54	30
U-235/236	-0.0022	U		-0.000409	U y	0.0205	1.00	0.0375	pCi/g			137	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*86.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16677/1-A
Matrix: Solid
Analysis Batch: 16937

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16677

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00352	U	0.0441	0.0441	1.00	0.0954	pCi/g	12/15/18 09:06	12/24/18 08:25	1
Pu-239/240	-0.00439	U	0.0441	0.0441	1.00	0.0989	pCi/g	12/15/18 09:06	12/24/18 08:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*70.6*		*30 - 105*	*12/15/18 09:06*	*12/24/18 08:25*	*1*

Lab Sample ID: LCS 300-16677/2-A
Matrix: Solid
Analysis Batch: 16937

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16677

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.45	3.759		0.879	1.00	0.107	pCi/g	84	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*70.7*		*30 - 105*

Lab Sample ID: 300-8903-1 DU
Matrix: Solid
Analysis Batch: 16937

Client Sample ID: B3L263
Prep Type: Total/NA
Prep Batch: 16677

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0067	U		-0.00507	U	0.0425	1.00	0.0981	pCi/g			27	30
Pu-239/240	0.00416	U		-0.00592	U y	0.0425	1.00	0.101	pCi/g			1150	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*61.9*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-044

TestAmerica Job ID: 300-8903-1
SDG: RL8903-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16679/1-A
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16679

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.596	U	0.186	2.08	15.0	4.00	pCi/g	12/15/18 10:26	12/29/18 13:04	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*70.6*			*12/15/18 10:26*	*12/29/18 13:04*	*1*

Lab Sample ID: LCS 300-16679/2-A
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16679

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			214	305.3	o	20.1	15.0	3.96	pCi/g	143	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*70.7*		

Lab Sample ID: 300-8903-1 DU
Matrix: Solid
Analysis Batch: 17050

Client Sample ID: B3L263
Prep Type: Total/NA
Prep Batch: 16679

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.66	U o		0.128	U y o	2.22	15.0	4.49	pCi/g			171	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*61.9*		

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01/7/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-010		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
01/07/2019 Date Scot Fitzgerald Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	01/07/2019 Date Reviewer/Point of Contact (print and sign) Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1.	No issues noted					Closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	1/7/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-010		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval

Jadie Kaas

1/7/2019 — Date

Jadie Kaas — Organization Manager (optional) (print and sign)

10. Agreement With Indicated Comment Disposition(s)

Date

Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

1/7/2019 — Date

Jadie Kaas

Jadie Kaas — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT accepted**)	16. Status
1	No issues noted					Closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR19-010
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-03-2019**

Technical Review By: Ellen McEntee **Date: 01-04-2019**

Quality Review By: Mary A. Donivan **Date: 01-07-2019**
Mary Donivan
Quality Assurance Manager

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Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Group (SDG) SL31889-1 and SL31915-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31889-1 and SL31915-1 prepared by TestAmerica Laboratories, Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1K6	11/14/18	Soil	C	8260C
B3L1J4	11/14/18	Soil	C	8260C
B3L1M1	11/14/18	Soil	C	8260C
B3L1M7	11/14/18	Soil	C	8260C
B3L1J1	11/14/18	Soil	C	8260C
B3L1K9	11/14/18	Soil	C	8260C
B3L1P5	11/14/18	Soil	C	8260C
B3L1N0	11/14/18	Soil	C	8260C
B3L1R4	11/14/18	Soil	C	8260C
B3L1K3	11/14/18	Soil	C	8260C
B3L1R7	11/14/18	Soil	C	8260C
B3L1P2	11/15/18	Soil	C	8260C
B3L1N6	11/15/18	Soil	C	8260C
B3L1N3	11/15/18	Soil	C	8260C
B3L1N9	11/15/18	Soil	C	8260C
B3L1H8	11/15/18	Soil	C	8260C
B3L1J7	11/15/18	Soil	C	8260C
B3L1T0	11/15/18	Soil	C	8260C
B3L1T5	11/15/18	Soil	C	8260C
B3L1R1	11/15/18	Soil	C	8260C
B3L1M4	11/15/18	Soil	C	8260C
B3L1L8	11/15/18	Soil	C	8260C
B3L1L5	11/15/18	Soil	C	8260C
B3L1H5	11/15/18	Soil	C	8260C
B3L1L2	11/15/18	Soil	C	8260C
B3L1K0	11/15/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. Sample preservation requires chilling to <-7 degrees Celsius but >-20 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved with the following exceptions.

For SDG SL31889-1, all samples were extracted beyond 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL31915-1, all samples with the exception of samples B3L1P2 and B3L1N6 were extracted beyond 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR. See the table in Appendix 2 for a listing of all affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exception.

For SDG SL31889-1 batch 405936, the methylene chloride laboratory blank result was a detect > the method detection limit (MDL) but <2X the reporting limit (RL). The methylene chloride result for associated sample B3L1K6 was non-detect and should not be qualified for the blank infraction.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exception.

For SDG SL31915-1, the 1,2-dichloroethane-d4 recoveries for samples B3L1P2, B3L1N6, B3L1H5 and the method blank (batch 403427) were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31899-1, batch 405936. the MS and MSD recoveries for chloroethane were below the lower acceptance limit but >20%. The chloroethane result for associated sample B3L1K6 was a non-detect and would be qualified as estimate and flagged UJ, but was further qualified as unusable and flagged "UR" due to analysis beyond 2X the holding time.

For SDG SL31915-1, batch 405466, the MS recoveries for 1,1-dichloroethene and carbon disulfide were above the upper acceptance limit. All associated sample results for 1,1-dichloroethene and carbon disulfide were non-detects and should not be qualified as a result.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable with the following exceptions.

For SDG SL31889-1, the LCS and/or LCSD results for chloroethane associated with batches 405936 and 406792 and for acetone associated with batch 406792 were below the lower acceptance limit but ≥40%. The chloroethane and acetone results for all associated samples were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to analysis beyond 2X the holding time. See the table in appendix 2 for a listing of all affected samples.

For SDG SL31915-1, batch 403427, the LCS and/or LCSD recoveries for bromomethane and chloroethane were > the upper acceptance limit. All associated sample results were non-detects

and should not be qualified as a result. The LCSD recovery for chloromethane associated with batch 403427 was < the lower acceptance limit but ≥40%. The chloromethane results for associated samples B3L1P2 and B3L1N6 were non-detects and should be qualified as estimates and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are <35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

LCS/LCSD Samples

All reported LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for VOCs with the exception of methylene chloride were not provided in the SAP.

- **Completeness**

SDGs SL31889 -1 and SL31915-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 7%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of all target analytes for all samples except samples B3L1P2 and B3L1N6 as unusable were due to holding time infraction.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results for sample B3L1P2 and B3L1N6 were due to low LCS recoveries.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDGs: SL31889-1, SL31915-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,1-dichloroethene, Total, 1,2-dichloropropane 2-butanone (MEK), 2-hexanone 4-methyl-2-pentanone (MIBK), Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroethane, Chloroform, Chloromethane, Cis-1,3-dichloropropene, Dibromochloromethane, Ethylbenzene, Methylene chloride, Styrene, Tetrachloroethene, Toluene, Trans-1,3-dichloropropene, Trichloroethene, Vinyl chloride, Xylenes, Total	UR	B3L1N3, B3L1N9, B3L1H8, B3L1J7, B3L1T0, B3L1T5, B3L1R1, B3L1M4, B3L1L8, B3L1L5, B3L1H5, B3L1L2, B3L1K0, B3L1K3, B3L1R7,	Analyzed beyond 2X the holding time.
Chloroethane	UR	B3L1K6	Analysis beyond 2X the holding time, low matrix spike recoveries, low

			LCS/LCSD recoveries
1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,1-dichloroethene, Total, 1,2-dichloropropane, 2-butanone (MEK), 2-hexanone, 4-methyl-2-pentanone, (MIBK), Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroform, Chloromethane, cis-1,3-dichloropropene, Dibromochloromethane, Ethylbenzene, Methylene chloride, Styrene, Tetrachloroethene, Toluene, trans-1,3-dichloropropene, Trichloroethene, Vinyl chloride, Xylenes, Total	UR	B3L1K6	Analysis beyond 2X the holding time
Chloroethane, Acetone	UR	B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4,	Analysis beyond 2X the holding time and low LCS/LCSD recoveries
1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluroethane, 1,1,2-trichloroethane,	UR	B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4,	Analysis beyond 2X the holding time

1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,1-dichloroethene, Total, 1,2-dichloropropane, 2-butanone (MEK), 2-hexanone, 4-methyl-2-pentanone, (MIBK), Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroform, Chloromethane, Cis-1,3-dichloropropene, Dibromochloromethane, Ethylbenzene, Methylene chloride, Styrene, Tetrachloroethene, Toluene, Trans-1,3- dichloropropene, Trichloroethene, Vinyl chloride, Xylenes, Total			
Chloromethane	UJ	B3L1P2, B3L1N6	Low LCS/LCSD recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/03/19	
			SDG: SL31889-1, SL31915-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
SDG SL31889-1: B3L1K6, B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4, B3L1K3, B3L1R7,					
SDG SL31915-1: B3L1P2, B3L1N6, B3L1N3, B3L1N9, B3L1H8, B3L1J7, B3L1T0, B3L1T5, B3L1R1, B3L1M4, B3L1L8, B3L1L5, B3L1H5, B3L1L2, B3L1K0,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG SL31889-1: (batch 405936) methylene chloride 3.89 ug/Kg;

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG SL31889-1:
(batch 405936) LCS/LCSD chloroethane 64%/65%: MS/MSD chloroethane 65%/66%
(batch 406792) LCS/LCSD chloroethane 59%/59%; LCSD acetone 63%

SDG SL31915-1:
surrogates: DCA B3L1P2 -136%; B3L1N6-144%, B3L1H5 143%, MB (batch 403427)132%
(batch 403427) LCS/LCSD bromomethane 164%/148%, LCSD chloroethane 138%, chloromethane 69%
(batch 405466) MS 1,1-dichloroethene 134%, carbon disulfide 134%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SDG 160-31889-1: All samples analyzed >2X holding time.

SDG 160-31915-1: Samples B3L1N3, B3L1N9, B3L1H8, B3L1J7, B3L1T0, B3L1T5, B3L1R1, B3L1M4, B3L1L8, B3L1L5, B3L1H5, B3L1L2, B3L1K0 analyzed beyond 2X holding time.

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL for methylene chloride was met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-405938/1-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405938

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
2-Hexanone	3.4	U	20	3.4	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Acetone	6.5	U	20	6.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Benzene	0.26	U	5.0	0.26	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromoform	1.9	U	5.0	1.9	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Bromomethane	2.4	U	10	2.4	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloroethane	2.0	U	10	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloroform	0.38	U	5.0	0.38	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Chloromethane	0.65	U	10	0.65	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Methylene Chloride	3.89	J	5.0	1.6	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Styrene	2.0	U	5.0	2.0	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Toluene	2.5	U	5.0	2.5	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg		12/15/18 12:00	12/15/18 14:09	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg		12/15/18 12:00	12/15/18 14:09	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*12/15/18 12:00*	*12/15/18 14:09*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
Dibromofluoromethane (Surr)	*96*		*53 - 143*	*12/15/18 12:00*	*12/15/18 14:09*	*1*
Toluene-d8 (Surr)	*101*		*74 - 135*	*12/15/18 12:00*	*12/15/18 14:09*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405938/2-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	44.2		ug/Kg		88	71 - 127
1,1,2,2-Tetrachloroethane	50.0	53.4		ug/Kg		107	52 - 140
1,1,2-Trichloroethane	50.0	52.0		ug/Kg		104	79 - 122
1,1-Dichloroethane	50.0	48.4		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	50.5		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	43.6		ug/Kg		87	68 - 128
1,2-Dichloroethene, Total	100	108		ug/Kg		108	79 - 121
1,2-Dichloropropane	50.0	55.0		ug/Kg		110	80 - 126
2-Butanone (MEK)	50.0	54.4		ug/Kg		109	41 - 140
2-Hexanone	50.0	48.9		ug/Kg		98	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	47.8		ug/Kg		96	67 - 130
Acetone	50.0	42.8		ug/Kg		86	39 - 140
Benzene	50.0	50.4		ug/Kg		101	80 - 120
Bromodichloromethane	50.0	47.8		ug/Kg		96	78 - 124
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	37.5		ug/Kg		75	61 - 132
Carbon disulfide	50.0	48.7		ug/Kg		97	74 - 124
Carbon tetrachloride	50.0	42.9		ug/Kg		86	68 - 130
Chlorobenzene	50.0	49.8		ug/Kg		100	80 - 120
Chloroethane	50.0	31.8	o	ug/Kg		64	73 - 129
Chloroform	50.0	44.8		ug/Kg		90	78 - 120
Chloromethane	50.0	39.6		ug/Kg		79	69 - 123
cis-1,3-Dichloropropene	50.0	56.5		ug/Kg		113	78 - 127
Dibromochloromethane	50.0	49.7		ug/Kg		99	77 - 126
Ethylbenzene	50.0	47.8		ug/Kg		96	79 - 126
Methylene Chloride	50.0	56.7	B	ug/Kg		113	76 - 120
Styrene	50.0	54.9		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	48.9		ug/Kg		98	76 - 126
Toluene	50.0	54.7		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	53.5		ug/Kg		107	77 - 136
Trichloroethene	50.0	47.7		ug/Kg		95	66 - 130
Vinyl chloride	50.0	36.2		ug/Kg		72	56 - 134
Xylenes, Total	100	110		ug/Kg		110	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: LCSD 160-405938/3-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	44.8		ug/Kg		90	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	51.1		ug/Kg		102	52 - 140	4	20
1,1,2-Trichloroethane	50.0	52.3		ug/Kg		105	79 - 122	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405938/3-A
Matrix: Solid
Analysis Batch: 405936

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	48.5		ug/Kg		97	80 - 120	0	20
1,1-Dichloroethene	50.0	51.2		ug/Kg		102	71 - 126	1	20
1,2-Dichloroethane	50.0	42.7		ug/Kg		85	68 - 128	2	20
1,2-Dichloroethene, Total	100	109		ug/Kg		109	79 - 121	1	20
1,2-Dichloropropane	50.0	54.0		ug/Kg		108	80 - 126	2	20
2-Butanone (MEK)	50.0	50.8		ug/Kg		102	41 - 140	7	20
2-Hexanone	50.0	47.7		ug/Kg		95	63 - 136	2	20
4-Methyl-2-pentanone (MIBK)	50.0	48.6		ug/Kg		97	67 - 130	2	20
Acetone	50.0	42.9		ug/Kg		86	39 - 140	0	20
Benzene	50.0	50.3		ug/Kg		101	80 - 120	0	20
Bromodichloromethane	50.0	47.6		ug/Kg		95	78 - 124	0	20
Bromoform	50.0	47.9		ug/Kg		96	67 - 135	2	20
Bromomethane	50.0	37.6		ug/Kg		75	61 - 132	0	20
Carbon disulfide	50.0	49.2		ug/Kg		98	74 - 124	1	20
Carbon tetrachloride	50.0	44.2		ug/Kg		88	68 - 130	3	20
Chlorobenzene	50.0	51.4		ug/Kg		103	80 - 120	3	20
Chloroethane	50.0	32.7	o	ug/Kg		65	73 - 129	3	20
Chloroform	50.0	44.8		ug/Kg		90	78 - 120	0	20
Chloromethane	50.0	39.3		ug/Kg		79	69 - 123	1	20
cis-1,3-Dichloropropene	50.0	56.3		ug/Kg		113	78 - 127	0	20
Dibromochloromethane	50.0	49.9		ug/Kg		100	77 - 126	0	20
Ethylbenzene	50.0	49.1		ug/Kg		98	79 - 126	3	20
Methylene Chloride	50.0	54.9	B	ug/Kg		110	76 - 120	3	20
Styrene	50.0	56.2		ug/Kg		112	80 - 129	2	20
Tetrachloroethene	50.0	50.4		ug/Kg		101	76 - 126	3	20
Toluene	50.0	55.1		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	52.6		ug/Kg		105	77 - 136	2	20
Trichloroethene	50.0	48.0		ug/Kg		96	66 - 130	1	20
Vinyl chloride	50.0	36.2		ug/Kg		72	56 - 134	0	20
Xylenes, Total	100	112		ug/Kg		112	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Lab Sample ID: 160-31889-7 MS
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3L1K6
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.51	U Z	43.8	39.3		ug/Kg	☼	90	80 - 120
1,1,2,2-Tetrachloroethane	2.3	U Z	43.8	40.0		ug/Kg	☼	91	78 - 120
1,1,2-Trichloroethane	1.4	U Z	43.8	46.8		ug/Kg	☼	107	80 - 120
1,1-Dichloroethane	0.46	U Z	43.8	43.3		ug/Kg	☼	99	80 - 120
1,1-Dichloroethene	1.9	U Z	43.8	45.1		ug/Kg	☼	103	78 - 121
1,2-Dichloroethane	1.0	U Z	43.8	37.7		ug/Kg	☼	86	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31889-7 MS
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3L1K6
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.6	U Z	87.5	95.5		ug/Kg	☼	109	80 - 120
1,2-Dichloropropane	0.71	U Z	43.8	47.3		ug/Kg	☼	108	80 - 120
2-Butanone (MEK)	2.3	U Z	43.8	45.1		ug/Kg	☼	103	69 - 124
2-Hexanone	4.0	U Z	43.8	41.2		ug/Kg	☼	94	62 - 118
4-Methyl-2-pentanone (MIBK)	3.0	U Z	43.8	42.6		ug/Kg	☼	97	73 - 125
Acetone	7.6	U Z	43.8	41.5		ug/Kg	☼	95	54 - 139
Benzene	0.30	U Z	43.8	45.1		ug/Kg	☼	103	80 - 120
Bromodichloromethane	0.58	U Z	43.8	41.9		ug/Kg	☼	96	80 - 120
Bromoform	2.3	U Z	43.8	42.7		ug/Kg	☼	98	80 - 125
Bromomethane	2.8	U Z	43.8	33.2		ug/Kg	☼	76	70 - 126
Carbon disulfide	0.81	U Z	43.8	42.8		ug/Kg	☼	98	79 - 121
Carbon tetrachloride	0.60	U Z	43.8	38.6		ug/Kg	☼	88	80 - 120
Chlorobenzene	0.96	U Z	43.8	44.1		ug/Kg	☼	101	80 - 120
Chloroethane	2.3	U Z o	43.8	28.4		ug/Kg	☼	65	64 - 133
Chloroform	0.45	U Z	43.8	40.1		ug/Kg	☼	92	80 - 120
Chloromethane	0.77	U Z	43.8	35.3		ug/Kg	☼	81	75 - 120
cis-1,3-Dichloropropene	2.5	U Z	43.8	49.1		ug/Kg	☼	112	80 - 120
Dibromochloromethane	1.5	U Z	43.8	44.3		ug/Kg	☼	101	80 - 120
Ethylbenzene	0.81	U Z	43.8	43.4		ug/Kg	☼	99	80 - 120
Methylene Chloride	1.9	U Z	43.8	47.2	B	ug/Kg	☼	108	77 - 123
Styrene	2.3	U Z	43.8	49.1		ug/Kg	☼	112	80 - 120
Tetrachloroethene	0.66	U Z	43.8	43.8		ug/Kg	☼	100	80 - 120
Toluene	3.0	U Z	43.8	48.6		ug/Kg	☼	111	80 - 124
trans-1,3-Dichloropropene	2.0	U Z	43.8	45.2		ug/Kg	☼	103	80 - 122
Trichloroethene	0.46	U Z	43.8	47.1		ug/Kg	☼	108	79 - 120
Vinyl chloride	0.51	U Z	43.8	31.9		ug/Kg	☼	73	71 - 120
Xylenes, Total	1.0	U Z	87.5	96.7		ug/Kg	☼	110	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*85*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: 160-31889-7 MSD
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3L1K6
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.51	U Z	47.7	43.8		ug/Kg	☼	92	80 - 120	11	20
1,1,2,2-Tetrachloroethane	2.3	U Z	47.7	44.2		ug/Kg	☼	93	78 - 120	10	20
1,1,2-Trichloroethane	1.4	U Z	47.7	50.0		ug/Kg	☼	105	80 - 120	7	20
1,1-Dichloroethane	0.46	U Z	47.7	46.9		ug/Kg	☼	98	80 - 120	8	20
1,1-Dichloroethene	1.9	U Z	47.7	49.0		ug/Kg	☼	103	78 - 121	8	20
1,2-Dichloroethane	1.0	U Z	47.7	41.8		ug/Kg	☼	88	78 - 117	10	20
1,2-Dichloroethene, Total	1.6	U Z	95.4	105		ug/Kg	☼	110	80 - 120	10	20
1,2-Dichloropropane	0.71	U Z	47.7	51.6		ug/Kg	☼	108	80 - 120	9	20
2-Butanone (MEK)	2.3	U Z	47.7	46.5		ug/Kg	☼	97	69 - 124	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31889-7 MSD
Matrix: Soil
Analysis Batch: 405936

Client Sample ID: B3L1K6
Prep Type: Total/NA
Prep Batch: 405938

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.0	U Z	47.7	44.5		ug/Kg	☼	93	62 - 118	8	20
4-Methyl-2-pentanone (MIBK)	3.0	U Z	47.7	45.0		ug/Kg	☼	94	73 - 125	5	20
Acetone	7.6	U Z	47.7	44.6		ug/Kg	☼	93	54 - 139	7	20
Benzene	0.30	U Z	47.7	49.3		ug/Kg	☼	103	80 - 120	9	20
Bromodichloromethane	0.58	U Z	47.7	45.8		ug/Kg	☼	96	80 - 120	9	20
Bromoform	2.3	U Z	47.7	48.2		ug/Kg	☼	101	80 - 125	12	20
Bromomethane	2.8	U Z	47.7	36.4		ug/Kg	☼	76	70 - 126	9	20
Carbon disulfide	0.81	U Z	47.7	47.2		ug/Kg	☼	99	79 - 121	10	20
Carbon tetrachloride	0.60	U Z	47.7	42.5		ug/Kg	☼	89	80 - 120	10	20
Chlorobenzene	0.96	U Z	47.7	48.4		ug/Kg	☼	102	80 - 120	9	20
Chloroethane	2.3	U Z o	47.7	31.7		ug/Kg	☼	66	64 - 133	11	20
Chloroform	0.45	U Z	47.7	44.2		ug/Kg	☼	93	80 - 120	10	20
Chloromethane	0.77	U Z	47.7	39.1		ug/Kg	☼	82	75 - 120	10	20
cis-1,3-Dichloropropene	2.5	U Z	47.7	53.0		ug/Kg	☼	111	80 - 120	8	20
Dibromochloromethane	1.5	U Z	47.7	47.9		ug/Kg	☼	100	80 - 120	8	20
Ethylbenzene	0.81	U Z	47.7	46.9		ug/Kg	☼	98	80 - 120	8	20
Methylene Chloride	1.9	U Z	47.7	51.2	B	ug/Kg	☼	107	77 - 123	8	20
Styrene	2.3	U Z	47.7	52.9		ug/Kg	☼	111	80 - 120	7	20
Tetrachloroethene	0.66	U Z	47.7	47.0		ug/Kg	☼	99	80 - 120	7	20
Toluene	3.0	U Z	47.7	53.0		ug/Kg	☼	111	80 - 124	9	20
trans-1,3-Dichloropropene	2.0	U Z	47.7	49.5		ug/Kg	☼	104	80 - 122	9	20
Trichloroethene	0.46	U Z	47.7	51.5		ug/Kg	☼	108	79 - 120	9	20
Vinyl chloride	0.51	U Z	47.7	35.9		ug/Kg	☼	75	71 - 120	12	20
Xylenes, Total	1.0	U Z	95.4	105		ug/Kg	☼	110	80 - 120	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: MB 160-406793/1-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406793

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
2-Hexanone	3.4	U	20	3.4	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg		12/20/18 05:43	12/20/18 07:44	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-406793/1-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406793

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.5	U	20	6.5	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Benzene	0.26	U	5.0	0.26	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Bromoform	1.9	U	5.0	1.9	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Bromomethane	2.4	U	10	2.4	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Chloroethane	2.0	U	10	2.0	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Chloroform	0.38	U	5.0	0.38	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Chloromethane	0.65	U	10	0.65	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Styrene	2.0	U	5.0	2.0	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Toluene	2.5	U	5.0	2.5	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg		12/20/18 05:43	12/20/18 07:44	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg		12/20/18 05:43	12/20/18 07:44	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*12/20/18 05:43*	*12/20/18 07:44*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*67 - 132*	*12/20/18 05:43*	*12/20/18 07:44*	*1*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*	*12/20/18 05:43*	*12/20/18 07:44*	*1*
Dibromofluoromethane (Surr)	*98*		*53 - 143*	*12/20/18 05:43*	*12/20/18 07:44*	*1*
Toluene-d8 (Surr)	*102*		*74 - 135*	*12/20/18 05:43*	*12/20/18 07:44*	*1*

Lab Sample ID: LCS 160-406793/2-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406793

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	42.3		ug/Kg		85	71 - 127
1,1,2,2-Tetrachloroethane	50.0	52.7		ug/Kg		105	52 - 140
1,1,2-Trichloroethane	50.0	52.1		ug/Kg		104	79 - 122
1,1-Dichloroethane	50.0	44.2		ug/Kg		88	80 - 120
1,1-Dichloroethene	50.0	48.4		ug/Kg		97	71 - 126
1,2-Dichloroethane	50.0	42.0		ug/Kg		84	68 - 128
1,2-Dichloroethene, Total	100	104		ug/Kg		104	79 - 121
1,2-Dichloropropane	50.0	50.2		ug/Kg		100	80 - 126
2-Butanone (MEK)	50.0	44.8		ug/Kg		90	41 - 140
2-Hexanone	50.0	43.7		ug/Kg		87	63 - 136

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406793/2-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406793

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Methyl-2-pentanone (MIBK)	50.0	41.5		ug/Kg		83	67 - 130
Acetone	50.0	35.0		ug/Kg		70	39 - 140
Benzene	50.0	47.4		ug/Kg		95	80 - 120
Bromodichloromethane	50.0	45.9		ug/Kg		92	78 - 124
Bromoform	50.0	49.2		ug/Kg		98	67 - 135
Bromomethane	50.0	37.4		ug/Kg		75	61 - 132
Carbon disulfide	50.0	45.1		ug/Kg		90	74 - 124
Carbon tetrachloride	50.0	41.9		ug/Kg		84	68 - 130
Chlorobenzene	50.0	49.5		ug/Kg		99	80 - 120
Chloroethane	50.0	29.3	o	ug/Kg		59	73 - 129
Chloroform	50.0	43.0		ug/Kg		86	78 - 120
Chloromethane	50.0	37.7		ug/Kg		75	69 - 123
cis-1,3-Dichloropropene	50.0	54.0		ug/Kg		108	78 - 127
Dibromochloromethane	50.0	50.0		ug/Kg		100	77 - 126
Ethylbenzene	50.0	47.4		ug/Kg		95	79 - 126
Methylene Chloride	50.0	50.8		ug/Kg		102	76 - 120
Styrene	50.0	53.8		ug/Kg		108	80 - 129
Tetrachloroethene	50.0	48.8		ug/Kg		98	76 - 126
Toluene	50.0	52.7		ug/Kg		105	76 - 136
trans-1,3-Dichloropropene	50.0	51.7		ug/Kg		103	77 - 136
Trichloroethene	50.0	45.8		ug/Kg		92	66 - 130
Vinyl chloride	50.0	35.6		ug/Kg		71	56 - 134
Xylenes, Total	100	107		ug/Kg		107	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-406793/3-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406793

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	42.6		ug/Kg		85	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	48.0		ug/Kg		96	52 - 140	9	20
1,1,2-Trichloroethane	50.0	49.4		ug/Kg		99	79 - 122	5	20
1,1-Dichloroethane	50.0	43.9		ug/Kg		88	80 - 120	1	20
1,1-Dichloroethene	50.0	47.9		ug/Kg		96	71 - 126	1	20
1,2-Dichloroethane	50.0	38.5		ug/Kg		77	68 - 128	9	20
1,2-Dichloroethene, Total	100	103		ug/Kg		103	79 - 121	1	20
1,2-Dichloropropane	50.0	48.4		ug/Kg		97	80 - 126	4	20
2-Butanone (MEK)	50.0	37.8		ug/Kg		76	41 - 140	17	20
2-Hexanone	50.0	39.4		ug/Kg		79	63 - 136	10	20
4-Methyl-2-pentanone (MIBK)	50.0	37.9		ug/Kg		76	67 - 130	9	20
Acetone	50.0	31.3		ug/Kg		63	39 - 140	11	20
Benzene	50.0	47.2		ug/Kg		94	80 - 120	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406793/3-A
Matrix: Solid
Analysis Batch: 406792

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406793

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	50.0	45.0		ug/Kg		90	78 - 124	2	20
Bromoform	50.0	46.4		ug/Kg		93	67 - 135	6	20
Bromomethane	50.0	36.5		ug/Kg		73	61 - 132	2	20
Carbon disulfide	50.0	45.5		ug/Kg		91	74 - 124	1	20
Carbon tetrachloride	50.0	42.6		ug/Kg		85	68 - 130	1	20
Chlorobenzene	50.0	49.2		ug/Kg		98	80 - 120	1	20
Chloroethane	50.0	29.7	o	ug/Kg		59	73 - 129	2	20
Chloroform	50.0	42.3		ug/Kg		85	78 - 120	2	20
Chloromethane	50.0	36.0		ug/Kg		72	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	51.9		ug/Kg		104	78 - 127	4	20
Dibromochloromethane	50.0	47.9		ug/Kg		96	77 - 126	4	20
Ethylbenzene	50.0	48.3		ug/Kg		97	79 - 126	2	20
Methylene Chloride	50.0	48.4		ug/Kg		97	76 - 120	5	20
Styrene	50.0	54.5		ug/Kg		109	80 - 129	1	20
Tetrachloroethene	50.0	49.3		ug/Kg		99	76 - 126	1	20
Toluene	50.0	53.6		ug/Kg		107	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	48.4		ug/Kg		97	77 - 136	7	20
Trichloroethene	50.0	45.8		ug/Kg		92	66 - 130	0	20
Vinyl chloride	50.0	35.6		ug/Kg		71	56 - 134	0	20
Xylenes, Total	100	108		ug/Kg		108	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*80*		*67 - 132*
4-Bromofluorobenzene (Surr)	*97*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/26/18 07:01	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/26/18 07:01	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/26/18 07:01	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/26/18 07:01	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/26/18 07:01	1
Acetone	6.5	U	20	6.5	ug/Kg			12/26/18 07:01	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/26/18 07:01	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/26/18 07:01	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/26/18 07:01	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	2.4	U	10	2.4	ug/Kg			12/26/18 07:01	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/26/18 07:01	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/26/18 07:01	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/26/18 07:01	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/26/18 07:01	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/26/18 07:01	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/26/18 07:01	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/26/18 07:01	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/26/18 07:01	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/26/18 07:01	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/26/18 07:01*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*		*12/26/18 07:01*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 150*		*12/26/18 07:01*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/26/18 07:01*	*1*
Toluene-d8 (Surr)	*100*		*74 - 135*		*12/26/18 07:01*	*1*

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.9		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	49.0		ug/Kg		98	52 - 140
1,1,2-Trichloroethane	50.0	49.0		ug/Kg		98	79 - 122
1,1-Dichloroethane	50.0	50.4		ug/Kg		101	80 - 120
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126
1,2-Dichloroethane	50.0	47.8		ug/Kg		96	68 - 128
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121
1,2-Dichloropropane	50.0	51.3		ug/Kg		103	80 - 126
2-Butanone (MEK)	50.0	46.0		ug/Kg		92	41 - 140
2-Hexanone	50.0	43.2		ug/Kg		86	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	43.4		ug/Kg		87	39 - 140
Benzene	50.0	52.1		ug/Kg		104	80 - 120
Bromodichloromethane	50.0	49.6		ug/Kg		99	78 - 124

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	50.7		ug/Kg		101	61 - 132
Carbon disulfide	50.0	53.0		ug/Kg		106	74 - 124
Carbon tetrachloride	50.0	51.1		ug/Kg		102	68 - 130
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120
Chloroethane	50.0	48.1		ug/Kg		96	73 - 129
Chloroform	50.0	49.1		ug/Kg		98	78 - 120
Chloromethane	50.0	45.4		ug/Kg		91	69 - 123
cis-1,3-Dichloropropene	50.0	54.3		ug/Kg		109	78 - 127
Dibromochloromethane	50.0	50.3		ug/Kg		101	77 - 126
Ethylbenzene	50.0	51.4		ug/Kg		103	79 - 126
Methylene Chloride	50.0	51.6		ug/Kg		103	76 - 120
Styrene	50.0	54.2		ug/Kg		108	80 - 129
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	52.7		ug/Kg		105	77 - 136
Trichloroethene	50.0	50.5		ug/Kg		101	66 - 130
Vinyl chloride	50.0	53.8		ug/Kg		108	56 - 134
Xylenes, Total	100	114		ug/Kg		114	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	52.8		ug/Kg		106	52 - 140	7	20
1,1,2-Trichloroethane	50.0	50.9		ug/Kg		102	79 - 122	4	20
1,1-Dichloroethane	50.0	51.0		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	53.0		ug/Kg		106	71 - 126	1	20
1,2-Dichloroethane	50.0	48.5		ug/Kg		97	68 - 128	2	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	0	20
1,2-Dichloropropane	50.0	52.3		ug/Kg		105	80 - 126	2	20
2-Butanone (MEK)	50.0	50.7		ug/Kg		101	41 - 140	10	20
2-Hexanone	50.0	48.7		ug/Kg		97	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)	50.0	46.4		ug/Kg		93	67 - 130	7	20
Acetone	50.0	47.0		ug/Kg		94	39 - 140	8	20
Benzene	50.0	52.1		ug/Kg		104	80 - 120	0	20
Bromodichloromethane	50.0	50.8		ug/Kg		102	78 - 124	2	20
Bromoform	50.0	52.8		ug/Kg		106	67 - 135	8	20
Bromomethane	50.0	50.2		ug/Kg		100	61 - 132	1	20
Carbon disulfide	50.0	52.8		ug/Kg		106	74 - 124	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon tetrachloride			50.0	50.9		ug/Kg		102	68 - 130	0	20
Chlorobenzene			50.0	51.9		ug/Kg		104	80 - 120	0	20
Chloroethane			50.0	46.2		ug/Kg		92	73 - 129	4	20
Chloroform			50.0	49.8		ug/Kg		100	78 - 120	2	20
Chloromethane			50.0	45.1		ug/Kg		90	69 - 123	1	20
cis-1,3-Dichloropropene			50.0	55.7		ug/Kg		111	78 - 127	3	20
Dibromochloromethane			50.0	52.9		ug/Kg		106	77 - 126	5	20
Ethylbenzene			50.0	51.9		ug/Kg		104	79 - 126	1	20
Methylene Chloride			50.0	52.2		ug/Kg		104	76 - 120	1	20
Styrene			50.0	55.0		ug/Kg		110	80 - 129	2	20
Tetrachloroethene			50.0	51.6		ug/Kg		103	76 - 126	1	20
Toluene			50.0	54.8		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene			50.0	55.1		ug/Kg		110	77 - 136	4	20
Trichloroethene			50.0	50.3		ug/Kg		101	66 - 130	0	20
Vinyl chloride			50.0	51.6		ug/Kg		103	56 - 134	4	20
Xylenes, Total			100	114		ug/Kg		114	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-31841-D-4-A MS
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane	0.40	U	45.0	49.0		ug/Kg	☼	109	80 - 120		
1,1,2,2-Tetrachloroethane	1.8	U	45.0	43.6		ug/Kg	☼	97	78 - 120		
1,1,2-Trichloroethane	1.1	U	45.0	42.8		ug/Kg	☼	95	80 - 120		
1,1-Dichloroethane	0.36	U	45.0	45.8		ug/Kg	☼	102	80 - 120		
1,1-Dichloroethene	1.5	U	45.0	47.0		ug/Kg	☼	104	78 - 121		
1,2-Dichloroethane	0.80	U	45.0	45.9		ug/Kg	☼	102	78 - 117		
1,2-Dichloroethene, Total	1.2	U	90.1	93.2		ug/Kg	☼	103	80 - 120		
1,2-Dichloropropane	0.56	U	45.0	45.6		ug/Kg	☼	101	80 - 120		
2-Butanone (MEK)	1.8	U	45.0	43.5		ug/Kg	☼	97	69 - 124		
2-Hexanone	3.1	U	45.0	36.8		ug/Kg	☼	82	62 - 118		
4-Methyl-2-pentanone (MIBK)	2.3	U	45.0	37.6		ug/Kg	☼	83	73 - 125		
Acetone	6.0	U	45.0	40.1		ug/Kg	☼	89	54 - 139		
Benzene	0.24	U	45.0	45.7		ug/Kg	☼	101	80 - 120		
Bromodichloromethane	0.46	U	45.0	46.4		ug/Kg	☼	103	80 - 120		
Bromoform	1.8	U	45.0	46.2		ug/Kg	☼	103	80 - 125		
Bromomethane	2.2	U	45.0	43.9		ug/Kg	☼	97	70 - 126		
Carbon disulfide	0.64	U	45.0	47.0		ug/Kg	☼	104	79 - 121		
Carbon tetrachloride	0.47	U	45.0	48.0		ug/Kg	☼	107	80 - 120		
Chlorobenzene	0.75	U	45.0	44.5		ug/Kg	☼	99	80 - 120		
Chloroethane	1.8	U	45.0	42.4		ug/Kg	☼	94	64 - 133		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-D-4-A MS
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroform	0.35	U	45.0	45.9		ug/Kg	☼	102	80 - 120
Chloromethane	0.60	U	45.0	39.5		ug/Kg	☼	88	75 - 120
cis-1,3-Dichloropropene	1.9	U	45.0	49.2		ug/Kg	☼	109	80 - 120
Dibromochloromethane	1.1	U	45.0	46.0		ug/Kg	☼	102	80 - 120
Ethylbenzene	0.64	U	45.0	44.6		ug/Kg	☼	99	80 - 120
Methylene Chloride	1.5	U	45.0	46.1		ug/Kg	☼	102	77 - 123
Styrene	1.8	U	45.0	46.4		ug/Kg	☼	103	80 - 120
Tetrachloroethene	0.52	U	45.0	45.5		ug/Kg	☼	101	80 - 120
Toluene	2.3	U	45.0	46.4		ug/Kg	☼	103	80 - 124
trans-1,3-Dichloropropene	1.6	U	45.0	47.2		ug/Kg	☼	105	80 - 122
Trichloroethene	0.36	U	45.0	46.2		ug/Kg	☼	103	79 - 120
Vinyl chloride	0.40	U	45.0	42.9		ug/Kg	☼	95	71 - 120
Xylenes, Total	0.78	U T	90.1	96.1		ug/Kg	☼	107	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.40	U	39.3	42.6		ug/Kg	☼	109	80 - 120	14	20
1,1,2,2-Tetrachloroethane	1.8	U	39.3	40.6		ug/Kg	☼	104	78 - 120	7	20
1,1,2-Trichloroethane	1.1	U	39.3	40.7		ug/Kg	☼	104	80 - 120	5	20
1,1-Dichloroethane	0.36	U	39.3	40.9		ug/Kg	☼	104	80 - 120	11	20
1,1-Dichloroethene	1.5	U	39.3	40.9		ug/Kg	☼	104	78 - 121	14	20
1,2-Dichloroethane	0.80	U	39.3	40.4		ug/Kg	☼	103	78 - 117	13	20
1,2-Dichloroethene, Total	1.2	U	78.5	82.9		ug/Kg	☼	106	80 - 120	12	20
1,2-Dichloropropane	0.56	U	39.3	40.7		ug/Kg	☼	104	80 - 120	11	20
2-Butanone (MEK)	1.8	U	39.3	37.9		ug/Kg	☼	97	69 - 124	14	20
2-Hexanone	3.1	U	39.3	37.1		ug/Kg	☼	95	62 - 118	1	20
4-Methyl-2-pentanone (MIBK)	2.3	U	39.3	36.5		ug/Kg	☼	93	73 - 125	3	20
Acetone	6.0	U	39.3	38.2		ug/Kg	☼	97	54 - 139	5	20
Benzene	0.24	U	39.3	41.0		ug/Kg	☼	104	80 - 120	11	20
Bromodichloromethane	0.46	U	39.3	41.5		ug/Kg	☼	106	80 - 120	11	20
Bromoform	1.8	U	39.3	43.1		ug/Kg	☼	110	80 - 125	7	20
Bromomethane	2.2	U	39.3	38.9		ug/Kg	☼	99	70 - 126	12	20
Carbon disulfide	0.64	U	39.3	40.9		ug/Kg	☼	104	79 - 121	14	20
Carbon tetrachloride	0.47	U	39.3	41.2		ug/Kg	☼	105	80 - 120	15	20
Chlorobenzene	0.75	U	39.3	40.8		ug/Kg	☼	104	80 - 120	9	20
Chloroethane	1.8	U	39.3	37.7		ug/Kg	☼	96	64 - 133	12	20
Chloroform	0.35	U	39.3	40.2		ug/Kg	☼	103	80 - 120	13	20
Chloromethane	0.60	U	39.3	35.6		ug/Kg	☼	91	75 - 120	10	20
cis-1,3-Dichloropropene	1.9	U	39.3	43.7		ug/Kg	☼	111	80 - 120	12	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	1.1	U	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylphenol	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31889-7	B3L1K6	89	100	95	99
160-31889-7 MS	B3L1K6	85	99	93	101
160-31889-7 MSD	B3L1K6	83	100	93	101
160-31889-8	B3L1J4	87	107	98	103
160-31889-9	B3L1M1	90	116	101	108
160-31889-10	B3L1M7	93	101	99	105
160-31889-11	B3L1J1	91	100	101	102
160-31889-12	B3L1K9	91	97	100	107
160-31889-18	B3L1P5	91	98	92	101
160-31889-19	B3L1N0	91	98	97	102
160-31889-20	B3L1R4	90	107	98	105
160-31889-21	B3L1K3	105	100	105	102
160-31889-22	B3L1R7	105	99	101	102

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31841-D-4-A MS	Matrix Spike	102	99	105	101
160-31841-E-4-A MSD	Matrix Spike Duplicate	103	101	106	106
LCS 160-405938/2-A	Lab Control Sample	86	100	95	100
LCS 160-406793/2-A	Lab Control Sample	86	98	95	102
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-405938/3-A	Lab Control Sample Dup	83	99	93	103
LCSD 160-406793/3-A	Lab Control Sample Dup	80	97	93	102
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-405938/1-A	Method Blank	87	99	96	101
MB 160-406793/1-A	Method Blank	85	101	98	102
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-403433/1-A
Matrix: Solid
Analysis Batch: 403427

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403433

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
2-Hexanone	3.4	U	20	3.4	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Acetone	6.5	U	20	6.5	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Benzene	0.26	U	5.0	0.26	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Bromoform	1.9	U	5.0	1.9	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Bromomethane	2.4	U	10	2.4	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Chloroethane	2.0	U	10	2.0	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Chloroform	0.38	U	5.0	0.38	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Chloromethane	0.65	U	10	0.65	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Styrene	2.0	U	5.0	2.0	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Toluene	2.5	U	5.0	2.5	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg		11/29/18 14:02	11/29/18 15:35	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg		11/29/18 14:02	11/29/18 15:35	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*11/29/18 14:02*	*11/29/18 15:35*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*132*		*67 - 132*	*11/29/18 14:02*	*11/29/18 15:35*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*	*11/29/18 14:02*	*11/29/18 15:35*	*1*
Dibromofluoromethane (Surr)	*117*		*53 - 143*	*11/29/18 14:02*	*11/29/18 15:35*	*1*
Toluene-d8 (Surr)	*104*		*74 - 135*	*11/29/18 14:02*	*11/29/18 15:35*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-403433/2-A
Matrix: Solid
Analysis Batch: 403427

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403433

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	57.8		ug/Kg		116	71 - 127
1,1,2,2-Tetrachloroethane	50.0	37.0		ug/Kg		74	52 - 140
1,1,2-Trichloroethane	50.0	45.2		ug/Kg		90	79 - 122
1,1-Dichloroethane	50.0	52.1		ug/Kg		104	80 - 120
1,1-Dichloroethene	50.0	39.2		ug/Kg		78	71 - 126
1,2-Dichloroethane	50.0	63.1		ug/Kg		126	68 - 128
1,2-Dichloroethene, Total	100	97.8		ug/Kg		98	79 - 121
1,2-Dichloropropane	50.0	49.9		ug/Kg		100	80 - 126
2-Butanone (MEK)	50.0	44.3		ug/Kg		89	41 - 140
2-Hexanone	50.0	38.6		ug/Kg		77	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	41.7		ug/Kg		83	67 - 130
Acetone	50.0	50.9		ug/Kg		102	39 - 140
Benzene	50.0	49.9		ug/Kg		100	80 - 120
Bromodichloromethane	50.0	61.5		ug/Kg		123	78 - 124
Bromoform	50.0	46.3		ug/Kg		93	67 - 135
Bromomethane	50.0	82.1	o	ug/Kg		164	61 - 132
Carbon disulfide	50.0	43.1		ug/Kg		86	74 - 124
Carbon tetrachloride	50.0	55.3		ug/Kg		111	68 - 130
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120
Chloroethane	50.0	69.0	o	ug/Kg		138	73 - 129
Chloroform	50.0	55.9		ug/Kg		112	78 - 120
Chloromethane	50.0	36.5		ug/Kg		73	69 - 123
cis-1,3-Dichloropropene	50.0	57.7		ug/Kg		115	78 - 127
Dibromochloromethane	50.0	54.9		ug/Kg		110	77 - 126
Ethylbenzene	50.0	54.2		ug/Kg		108	79 - 126
Methylene Chloride	50.0	45.0		ug/Kg		90	76 - 120
Styrene	50.0	53.6		ug/Kg		107	80 - 129
Tetrachloroethene	50.0	52.5		ug/Kg		105	76 - 126
Toluene	50.0	51.6		ug/Kg		103	76 - 136
trans-1,3-Dichloropropene	50.0	56.4		ug/Kg		113	77 - 136
Trichloroethene	50.0	54.5		ug/Kg		109	66 - 130
Vinyl chloride	50.0	46.1		ug/Kg		92	56 - 134
Xylenes, Total	100	108		ug/Kg		108	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*125*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*115*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: LCSD 160-403433/3-A
Matrix: Solid
Analysis Batch: 403427

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 403433

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.2		ug/Kg		112	71 - 127	3	20
1,1,2,2-Tetrachloroethane	50.0	37.8		ug/Kg		76	52 - 140	2	20
1,1,2-Trichloroethane	50.0	44.8		ug/Kg		90	79 - 122	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-403433/3-A
Matrix: Solid
Analysis Batch: 403427

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 403433

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	51.2		ug/Kg		102	80 - 120	2	20
1,1-Dichloroethene	50.0	39.1		ug/Kg		78	71 - 126	0	20
1,2-Dichloroethane	50.0	62.9		ug/Kg		126	68 - 128	0	20
1,2-Dichloroethene, Total	100	96.4		ug/Kg		96	79 - 121	1	20
1,2-Dichloropropane	50.0	49.3		ug/Kg		99	80 - 126	1	20
2-Butanone (MEK)	50.0	49.1		ug/Kg		98	41 - 140	10	20
2-Hexanone	50.0	38.7		ug/Kg		77	63 - 136	0	20
4-Methyl-2-pentanone (MIBK)	50.0	44.3		ug/Kg		89	67 - 130	6	20
Acetone	50.0	51.5		ug/Kg		103	39 - 140	1	20
Benzene	50.0	49.3		ug/Kg		99	80 - 120	1	20
Bromodichloromethane	50.0	60.1		ug/Kg		120	78 - 124	2	20
Bromoform	50.0	46.0		ug/Kg		92	67 - 135	1	20
Bromomethane	50.0	74.0	o	ug/Kg		148	61 - 132	10	20
Carbon disulfide	50.0	39.7		ug/Kg		79	74 - 124	8	20
Carbon tetrachloride	50.0	52.9		ug/Kg		106	68 - 130	5	20
Chlorobenzene	50.0	50.1		ug/Kg		100	80 - 120	3	20
Chloroethane	50.0	53.9	y	ug/Kg		108	73 - 129	25	20
Chloroform	50.0	55.6		ug/Kg		111	78 - 120	1	20
Chloromethane	50.0	34.6		ug/Kg		69	69 - 123	5	20
cis-1,3-Dichloropropene	50.0	58.9		ug/Kg		118	78 - 127	2	20
Dibromochloromethane	50.0	53.5		ug/Kg		107	77 - 126	3	20
Ethylbenzene	50.0	52.4		ug/Kg		105	79 - 126	3	20
Methylene Chloride	50.0	45.9		ug/Kg		92	76 - 120	2	20
Styrene	50.0	52.8		ug/Kg		106	80 - 129	2	20
Tetrachloroethene	50.0	50.4		ug/Kg		101	76 - 126	4	20
Toluene	50.0	49.4		ug/Kg		99	76 - 136	4	20
trans-1,3-Dichloropropene	50.0	53.8		ug/Kg		108	77 - 136	5	20
Trichloroethene	50.0	54.4		ug/Kg		109	66 - 130	0	20
Vinyl chloride	50.0	43.9		ug/Kg		88	56 - 134	5	20
Xylenes, Total	100	103		ug/Kg		103	79 - 132	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*126*		*67 - 132*
4-Bromofluorobenzene (Surr)	*94*		*59 - 150*
Dibromofluoromethane (Surr)	*114*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Lab Sample ID: MB 160-405466/8
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/13/18 08:46	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/13/18 08:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/13/18 08:46	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 08:46	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/13/18 08:46	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/13/18 08:46	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-405466/8
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/13/18 08:46	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/13/18 08:46	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/13/18 08:46	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/13/18 08:46	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/13/18 08:46	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/13/18 08:46	1
Acetone	6.5	U	20	6.5	ug/Kg			12/13/18 08:46	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/13/18 08:46	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/13/18 08:46	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/13/18 08:46	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/13/18 08:46	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/13/18 08:46	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/13/18 08:46	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/13/18 08:46	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/13/18 08:46	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/13/18 08:46	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/13/18 08:46	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/13/18 08:46	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 08:46	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/13/18 08:46	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/13/18 08:46	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/13/18 08:46	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/13/18 08:46	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/13/18 08:46	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/13/18 08:46	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/13/18 08:46	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/13/18 08:46	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/13/18 08:46	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/13/18 08:46*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*67 - 132*		*12/13/18 08:46*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*		*12/13/18 08:46*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/13/18 08:46*	*1*
Toluene-d8 (Surr)	*101*		*74 - 135*		*12/13/18 08:46*	*1*

Lab Sample ID: LCS 160-405466/5
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.0		ug/Kg		102	71 - 127
1,1,2,2-Tetrachloroethane	50.0	46.8		ug/Kg		94	52 - 140
1,1,2-Trichloroethane	50.0	48.5		ug/Kg		97	79 - 122
1,1-Dichloroethane	50.0	50.1		ug/Kg		100	80 - 120

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405466/5
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	51.1		ug/Kg		102	71 - 126
1,2-Dichloroethane	50.0	49.4		ug/Kg		99	68 - 128
1,2-Dichloroethene, Total	100	105		ug/Kg		105	79 - 121
1,2-Dichloropropane	50.0	52.2		ug/Kg		104	80 - 126
2-Butanone (MEK)	50.0	47.6		ug/Kg		95	41 - 140
2-Hexanone	50.0	45.7		ug/Kg		91	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	45.0		ug/Kg		90	67 - 130
Acetone	50.0	42.1		ug/Kg		84	39 - 140
Benzene	50.0	50.2		ug/Kg		100	80 - 120
Bromodichloromethane	50.0	52.1		ug/Kg		104	78 - 124
Bromoform	50.0	48.4		ug/Kg		97	67 - 135
Bromomethane	50.0	52.6		ug/Kg		105	61 - 132
Carbon disulfide	50.0	50.2		ug/Kg		100	74 - 124
Carbon tetrachloride	50.0	51.6		ug/Kg		103	68 - 130
Chlorobenzene	50.0	50.7		ug/Kg		101	80 - 120
Chloroethane	50.0	46.2		ug/Kg		92	73 - 129
Chloroform	50.0	48.6		ug/Kg		97	78 - 120
Chloromethane	50.0	59.2		ug/Kg		118	69 - 123
cis-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	78 - 127
Dibromochloromethane	50.0	51.0		ug/Kg		102	77 - 126
Ethylbenzene	50.0	50.5		ug/Kg		101	79 - 126
Methylene Chloride	50.0	50.7		ug/Kg		101	76 - 120
Styrene	50.0	55.5		ug/Kg		111	80 - 129
Tetrachloroethene	50.0	51.5		ug/Kg		103	76 - 126
Toluene	50.0	55.2		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	53.3		ug/Kg		107	77 - 136
Trichloroethene	50.0	50.0		ug/Kg		100	66 - 130
Vinyl chloride	50.0	52.0		ug/Kg		104	56 - 134
Xylenes, Total	100	111		ug/Kg		111	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*97*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-405466/6
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.0		ug/Kg		102	71 - 127	0	20
1,1,2,2-Tetrachloroethane	50.0	49.5		ug/Kg		99	52 - 140	6	20
1,1,2-Trichloroethane	50.0	49.4		ug/Kg		99	79 - 122	2	20
1,1-Dichloroethane	50.0	50.8		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	51.5		ug/Kg		103	71 - 126	1	20
1,2-Dichloroethane	50.0	48.8		ug/Kg		98	68 - 128	1	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405466/6
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane			50.0	52.7		ug/Kg		105	80 - 126	1	20
2-Butanone (MEK)			50.0	50.8		ug/Kg		102	41 - 140	7	20
2-Hexanone			50.0	46.9		ug/Kg		94	63 - 136	3	20
4-Methyl-2-pentanone (MIBK)			50.0	46.1		ug/Kg		92	67 - 130	2	20
Acetone			50.0	45.1		ug/Kg		90	39 - 140	7	20
Benzene			50.0	50.4		ug/Kg		101	80 - 120	0	20
Bromodichloromethane			50.0	51.6		ug/Kg		103	78 - 124	1	20
Bromoform			50.0	49.1		ug/Kg		98	67 - 135	1	20
Bromomethane			50.0	50.3		ug/Kg		101	61 - 132	4	20
Carbon disulfide			50.0	50.5		ug/Kg		101	74 - 124	1	20
Carbon tetrachloride			50.0	50.4		ug/Kg		101	68 - 130	2	20
Chlorobenzene			50.0	49.8		ug/Kg		100	80 - 120	2	20
Chloroethane			50.0	45.8		ug/Kg		92	73 - 129	1	20
Chloroform			50.0	48.7		ug/Kg		97	78 - 120	0	20
Chloromethane			50.0	61.4		ug/Kg		123	69 - 123	4	20
cis-1,3-Dichloropropene			50.0	56.9		ug/Kg		114	78 - 127	3	20
Dibromochloromethane			50.0	51.1		ug/Kg		102	77 - 126	0	20
Ethylbenzene			50.0	49.7		ug/Kg		99	79 - 126	2	20
Methylene Chloride			50.0	52.2		ug/Kg		104	76 - 120	3	20
Styrene			50.0	55.2		ug/Kg		110	80 - 129	1	20
Tetrachloroethene			50.0	50.7		ug/Kg		101	76 - 126	2	20
Toluene			50.0	53.8		ug/Kg		108	76 - 136	2	20
trans-1,3-Dichloropropene			50.0	53.1		ug/Kg		106	77 - 136	0	20
Trichloroethene			50.0	49.9		ug/Kg		100	66 - 130	0	20
Vinyl chloride			50.0	52.8		ug/Kg		106	56 - 134	2	20
Xylenes, Total			100	110		ug/Kg		110	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-31915-2 MS
Matrix: Soil
Analysis Batch: 405466

Client Sample ID: B3L1N6
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane	0.52	U Z	48.7	51.1		ug/Kg	☼	105	80 - 120		
1,1,2,2-Tetrachloroethane	2.4	U Z	48.7	45.8		ug/Kg	☼	94	78 - 120		
1,1,2-Trichloroethane	1.4	U Z	48.7	48.5		ug/Kg	☼	100	80 - 120		
1,1-Dichloroethane	0.47	U Z	48.7	50.2		ug/Kg	☼	103	80 - 120		
1,1-Dichloroethene	1.9	U Z T	48.7	65.3	T	ug/Kg	☼	134	78 - 121		
1,2-Dichloroethane	1.1	U Z	48.7	48.4		ug/Kg	☼	99	78 - 117		
1,2-Dichloroethene, Total	1.6	U Z	97.4	102		ug/Kg	☼	105	80 - 120		
1,2-Dichloropropane	0.73	U Z	48.7	51.9		ug/Kg	☼	107	80 - 120		
2-Butanone (MEK)	2.3	U Z	48.7	47.0		ug/Kg	☼	96	69 - 124		
2-Hexanone	4.1	U Z	48.7	38.8		ug/Kg	☼	80	62 - 118		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-2 MS
Matrix: Soil
Analysis Batch: 405466

Client Sample ID: B3L1N6
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Methyl-2-pentanone (MIBK)	3.1	U Z	48.7	42.7		ug/Kg	☼	88	73 - 125
Acetone	7.8	U Z	48.7	50.2		ug/Kg	☼	103	54 - 139
Benzene	0.31	U Z	48.7	49.1		ug/Kg	☼	101	80 - 120
Bromodichloromethane	0.60	U Z	48.7	51.1		ug/Kg	☼	105	80 - 120
Bromoform	2.3	U Z	48.7	49.6		ug/Kg	☼	102	80 - 125
Bromomethane	2.9	U Z	48.7	48.8		ug/Kg	☼	100	70 - 126
Carbon disulfide	0.83	U Z T	48.7	65.2	T	ug/Kg	☼	134	79 - 121
Carbon tetrachloride	0.62	U Z	48.7	49.9		ug/Kg	☼	102	80 - 120
Chlorobenzene	0.98	U Z	48.7	49.6		ug/Kg	☼	102	80 - 120
Chloroethane	2.4	U Z	48.7	49.1		ug/Kg	☼	101	64 - 133
Chloroform	0.46	U Z	48.7	49.2		ug/Kg	☼	101	80 - 120
Chloromethane	0.79	U Z	48.7	56.5		ug/Kg	☼	116	75 - 120
cis-1,3-Dichloropropene	2.6	U Z	48.7	54.2		ug/Kg	☼	111	80 - 120
Dibromochloromethane	1.5	U Z	48.7	50.4		ug/Kg	☼	104	80 - 120
Ethylbenzene	0.83	U Z	48.7	49.3		ug/Kg	☼	101	80 - 120
Methylene Chloride	1.9	U Z	48.7	49.9		ug/Kg	☼	103	77 - 123
Styrene	2.4	U Z	48.7	52.7		ug/Kg	☼	108	80 - 120
Tetrachloroethene	0.68	U Z	48.7	48.0		ug/Kg	☼	99	80 - 120
Toluene	3.0	U Z	48.7	53.5		ug/Kg	☼	110	80 - 124
trans-1,3-Dichloropropene	2.1	U Z	48.7	52.4		ug/Kg	☼	108	80 - 122
Trichloroethene	0.47	U Z	48.7	51.4		ug/Kg	☼	106	79 - 120
Vinyl chloride	0.52	U Z	48.7	51.8		ug/Kg	☼	106	71 - 120
Xylenes, Total	1.0	U Z	97.4	106		ug/Kg	☼	109	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*97*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-31915-2 MSD
Matrix: Soil
Analysis Batch: 405466

Client Sample ID: B3L1N6
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.52	U Z	47.6	49.8		ug/Kg	☼	105	80 - 120	2	20
1,1,2,2-Tetrachloroethane	2.4	U Z	47.6	43.0		ug/Kg	☼	90	78 - 120	6	20
1,1,2-Trichloroethane	1.4	U Z	47.6	48.0		ug/Kg	☼	101	80 - 120	1	20
1,1-Dichloroethane	0.47	U Z	47.6	49.4		ug/Kg	☼	104	80 - 120	2	20
1,1-Dichloroethene	1.9	U Z T	47.6	50.0	y	ug/Kg	☼	105	78 - 121	26	20
1,2-Dichloroethane	1.1	U Z	47.6	47.8		ug/Kg	☼	100	78 - 117	1	20
1,2-Dichloroethene, Total	1.6	U Z	95.3	103		ug/Kg	☼	108	80 - 120	1	20
1,2-Dichloropropane	0.73	U Z	47.6	51.6		ug/Kg	☼	108	80 - 120	0	20
2-Butanone (MEK)	2.3	U Z	47.6	46.4		ug/Kg	☼	97	69 - 124	1	20
2-Hexanone	4.1	U Z	47.6	36.6		ug/Kg	☼	77	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	3.1	U Z	47.6	43.1		ug/Kg	☼	90	73 - 125	1	20
Acetone	7.8	U Z	47.6	54.0		ug/Kg	☼	113	54 - 139	7	20
Benzene	0.31	U Z	47.6	48.9		ug/Kg	☼	103	80 - 120	0	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-2 MSD
Matrix: Soil
Analysis Batch: 405466

Client Sample ID: B3L1N6
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.60	U Z	47.6	50.1		ug/Kg	☼	105	80 - 120	2	20
Bromoform	2.3	U Z	47.6	50.2		ug/Kg	☼	105	80 - 125	1	20
Bromomethane	2.9	U Z	47.6	48.0		ug/Kg	☼	101	70 - 126	2	20
Carbon disulfide	0.83	U Z T	47.6	47.9	y	ug/Kg	☼	101	79 - 121	31	20
Carbon tetrachloride	0.62	U Z	47.6	48.8		ug/Kg	☼	103	80 - 120	2	20
Chlorobenzene	0.98	U Z	47.6	47.9		ug/Kg	☼	101	80 - 120	3	20
Chloroethane	2.4	U Z	47.6	44.4		ug/Kg	☼	93	64 - 133	10	20
Chloroform	0.46	U Z	47.6	47.4		ug/Kg	☼	99	80 - 120	4	20
Chloromethane	0.79	U Z	47.6	56.9		ug/Kg	☼	120	75 - 120	1	20
cis-1,3-Dichloropropene	2.6	U Z	47.6	52.7		ug/Kg	☼	111	80 - 120	3	20
Dibromochloromethane	1.5	U Z	47.6	49.7		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.83	U Z	47.6	47.7		ug/Kg	☼	100	80 - 120	3	20
Methylene Chloride	1.9	U Z	47.6	50.2		ug/Kg	☼	105	77 - 123	0	20
Styrene	2.4	U Z	47.6	51.9		ug/Kg	☼	109	80 - 120	2	20
Tetrachloroethene	0.68	U Z	47.6	46.4		ug/Kg	☼	97	80 - 120	3	20
Toluene	3.0	U Z	47.6	52.4		ug/Kg	☼	110	80 - 124	2	20
trans-1,3-Dichloropropene	2.1	U Z	47.6	50.9		ug/Kg	☼	107	80 - 122	3	20
Trichloroethene	0.47	U Z	47.6	51.2		ug/Kg	☼	108	79 - 120	0	20
Vinyl chloride	0.52	U Z	47.6	51.4		ug/Kg	☼	108	71 - 120	1	20
Xylenes, Total	1.0	U Z	95.3	104		ug/Kg	☼	109	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31915-1	B3L1P2	136 X	101	118	102
160-31915-2	B3L1N6	144 X	105	126	106
160-31915-2	B3L1N6	107	104	107	103
160-31915-2 MS	B3L1N6	98	102	97	100
160-31915-2 MSD	B3L1N6	99	104	100	104
160-31915-3	B3L1N3	105	102	104	103
160-31915-4	B3L1N9	109	103	104	102
160-31915-5	B3L1H8	100	122	102	103
160-31915-6	B3L1J7	110	103	107	103
160-31915-7	B3L1T0	110	101	106	101
160-31915-8	B3L1T5	111	100	107	102
160-31915-9	B3L1R1	112	105	106	108
160-31915-10	B3L1M4	114	99	104	102
160-31915-19	B3L1L8	113	100	108	103
160-31915-20	B3L1L5	115	123	112	111
160-31915-21	B3L1H5	120	143	106	109
160-31915-22	B3L1L2	117	105	109	103
160-31915-23	B3L1K0	117	107	106	106

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-403433/2-A	Lab Control Sample	125	96	115	101
LCS 160-405466/5	Lab Control Sample	96	97	98	102
LCSD 160-403433/3-A	Lab Control Sample Dup	126	94	114	99
LCSD 160-405466/6	Lab Control Sample Dup	96	100	100	100
MB 160-403433/1-A	Method Blank	132	99	117	104
MB 160-405466/8	Method Blank	101	99	102	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL31889-1, SL31915-1, GEL464556 and GEL464714

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31889-1 and SL31915-1 prepared by TestAmerica Laboratories Inc and SDGs GEL464556 and GEL464714 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1K6	11/14/18	Soil	C	8270D
B3L1J4	11/14/18	Soil	C	8270D
B3L1M1	11/14/18	Soil	C	8270D
B3L1M7	11/14/18	Soil	C	8270D
B3L1J1	11/14/18	Soil	C	8270D
B3L1K9	11/14/18	Soil	C	8270D
B3L1P5	11/14/18	Soil	C	8270D
B3L1N0	11/14/18	Soil	C	8270D
B3L1R4	11/14/18	Soil	C	8270D
B3L1K3	11/14/18	Soil	C	8270D
B3L1R7	11/14/18	Soil	C	8270D
B3L1H8	11/15/18	Soil	C	8270D
B3L1T0	11/15/18	Soil	C	8270D
B3L1M4	11/15/18	Soil	C	8270D
B3L1L2	11/15/18	Soil	C	8270D
B3L1P2	11/15/18	Soil	C	8270D
B3L1N6	11/15/18	Soil	C	8270D
B3L1N3	11/15/18	Soil	C	8270D
B3L1N9	11/15/18	Soil	C	8270D
B3L1J7	11/15/18	Soil	C	8270D
B3L1R1	11/15/18	Soil	C	8270D
B3L1L8	11/15/18	Soil	C	8270D
B3L1L5	11/15/18	Soil	C	8270D
B3L1H5	11/15/18	Soil	C	8270D
B3L1K0	11/15/18	Soil	C	8270D
B3MMT9	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMW9	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMV2	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMX0	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMW0	11/14/18	Soil	C	WTPH-D, WTPH-G

B3MMW1	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMV8	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMW6	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMV4	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMV3	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMT8	11/14/18	Soil	C	WTPH-D, WTPH-G
B3MMT6	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMT7	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV0	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV1	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV5	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV6	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV7	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMV9	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMW2	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMW3	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMW4	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMW5	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMW8	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMX1	11/15/18	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for WTPH-G requires analysis within 14 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG GEL464714, all samples were extracted beyond but within 2X the holding time for WTPH-D. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits and matrix spike sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

Method 8270D
For SDG SL31915-1, all surrogates for sample B3L1L5 were < 20%. The sample was analyzed at a dilution, therefore based on professional judgment; data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

Method 8270D
For SDG SL31889-1, the MS and MSD recoveries for 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol were <20%.

The parent sample and the MS and MSD samples were analyzed at dilutions, therefore based on professional judgment, data should not be qualified as a result.

Method WTPH-G
For SDG GEL464556, the MS and MSD recoveries for GRO were < the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG GEL464714, the MSD recovery for GRO was < the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

Method 8270D
For SDG SL31889-1, the LCS recoveries for 2,4-dinitrophenol, 3,3′-dichlorobenzidine, 3-nitroaniline, 4-chloroaniline, bis(2-chloroethyl)ether and hexachlorocyclopentadiene were < the lower acceptance limit but > 40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG SL31915-1, the LCS recoveries for 3,3′-dichlorobenzidine and 4-chloroaniline were < the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35% as specified by the DV procedure.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

- **Completeness**

SDGs SL31889-1, SL31915-1, GEL464556 and GEL464714 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to LCS recovery infractions, missed holding time and low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, February 2018.*

S740227-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL31889-1, SL31915-1, GEL464556, GEL464714	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4-dinitrophenol, 3-nitroaniline, bis(2-chloroethyl)ether, hexachlorocyclopentadiene	UJ	B3L1K6, B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4, B3L1K3, B3L1R7	Low LCS recoveries
3,3′dichlorobenzidine, 4-chloroaniline	UJ	B3L1P2, B3L1N6, B3L1N3, B3L1N9, B3L1H8, B3L1J7, B3L1T0, B3L1R1, B3L1M4, B3L1L8, B3L1L5, B3L1H5, B3L1L2, B3L1K0, B3L1K6, B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4, B3L1K3, B3L1R7	Low LCS recoveries
WTPH-D	UJ	B3MMT6, B3MMT7, B3MMV0, B3MMV1, B3MMV5, B3MMV6, B3MMV7, B3MMV9, B3MMW2, B3MMW3, B3MMW4, B3MMW5, B3MMW8, B3MMX1	Extracted beyond but within 2X the holding time.
WTPH-G	UJ	B3MMT9, B3MMW9, B3MMV2, B3MMX0, B3MMW0, B3MMW1, B3MMV8, B3MMW6, B3MMV4, B3MMV3, B3MMT8, B3MMT6, B3MMT7, B3MMV0, B3MMV1, B3MMV5, B3MMV6, B3MMV7, B3MMV9, B3MMW2, B3MMW3, B3MMW4,	Low matrix spike recoveries

		B3MMW5, B3MMW8, B3MMX1	

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/03/19	
			SDG: SL31889-1, SL31915-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL31889-1: B3L1K6, B3L1J4, B3L1M1, B3L1M7, B3L1J1, B3L1K9, B3L1P5, B3L1N0, B3L1R4, B3L1K3, B3L1R7					
SDG SL31915-1: B3L1H8, B3L1T0, B3L1M4, B3L1L2, B3L1P2, B3L1N6, B3L1N3, B3L1N9, B3L1J7, B3L1R1, B3L1L8, B3L1L5, B3L2H5, B3L1K0,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG SL31889-1: MS/MSD 2,4-dichlorophenol 0%/0%; 4,6-dinitro-2-methylphenol 0%/0%; 4-nitrophenol 0%/0%, hexachlorocyclopentadiene 0%/0%, pentachlorophenol 0%/0%
LCS, 2,4-dinitrophenol 64%, 3,3'dichlorobenzidine 65%, 3-nitroanilinie 69%, 4-chloroaniline 62%, bis(2-chloroethyl)ether 69%, hexachlorocyclopentadiene 64%,

SDG SL31915-1: All surrogates for sample B3L1L5 were < lower acceptance limit.
LCS 3,3-dichlorobenzidine 66%, 4-chloroaniline 65%,

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDL were not provided in the SAP.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/03/19	
			SDG: GEL464556, GEL464714		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	
SAMPLES/MATRIX: Soil					
SDG GEL464556: B3MMT9, B3MMW9, B3MMV2, B3MMX0, B3MMW0, B3MMW1, B3MMV8, B3MMW6, B3MMV4, B3MMV3, B3MMT8					
SDG GEL464714: B3MMT6, B3MMT7, B3MMV0, B3MMV1, B3MMV5, B3MMV6, B3MMV7, B3MMV9, B3MMW2, B3MMW3, B3MMW4, B3MMW5, B3MMW8, B3MMX1					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG GEL464556: MS/MSD GRO 58%/63%

SDG GEL464714: MSD GRO 66%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SDG GEL464714: Samples were extracted beyond the holding time for WTPH-D.

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	1.1	U	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Methylphenol	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Nitrophenol	140	U	330	140	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
2-Picoline	45	U	660	45	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acenaphthene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acenaphthylene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Acetophenone	34	U	330	34	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Aniline	60	U	330	60	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Anthracene	49	U	330	49	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Aramite	330	U	660	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Carbazole	47	U	330	47	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Chrysene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Diallate	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dibenzofuran	41	U	330	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Diethylphthalate	82	U	330	82	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dimethoate	100	U	660	100	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Dinoseb	330	U	660	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Disulfoton	41	U	1600	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Famphur	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Fluoranthene	50	U	330	50	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Fluorene	46	U	330	46	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachloroethane	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isodrin	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isophorone	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Isosafrole	67	U	660	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Kepone	330	U	3300	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methapyrilene	140	U	1600	140	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Methyl parathion	120	U	1600	120	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Naphthalene	35	U	330	35	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Nitrobenzene	40	U	330	40	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
o-Toluidine	51	U	330	51	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Parathion	98	U	1600	98	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenacetin	54	U	660	54	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenanthrene	42	U	330	42	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phenol	38	U	330	38	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Phorate	37	U	1600	37	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pronamide	53	U	660	53	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Pyrene	73	U	330	73	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-401921/1-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pyridine	71	U	660	71	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Safrole	33	U	660	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/20/18 17:21	12/03/18 11:33	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/20/18 17:21	12/03/18 11:33	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*478*	*N J*	*ug/Kg*		*4.27*	*141-79-7*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Unknown	*7450*	*N*	*ug/Kg*		*4.61*		*11/20/18 17:21*	*12/03/18 11:33*	*1*
Unknown	*733*	*N*	*ug/Kg*		*5.15*		*11/20/18 17:21*	*12/03/18 11:33*	*1*
n-Hexadecanoic acid	*478*	*N J*	*ug/Kg*		*10.99*	*57-10-3*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
5-Eicosene, (E)-	*352*	*N J*	*ug/Kg*		*13.89*	*74685-30-6*	*11/20/18 17:21*	*12/03/18 11:33*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*69*		*47 - 125*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
2-Fluorophenol (Surr)	*76*		*54 - 102*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Phenol-d5 (Surr)	*75*		*51 - 104*	*11/20/18 17:21*	*12/03/18 11:33*	*1*
Terphenyl-d14 (Surr)	*82*		*59 - 98*	*11/20/18 17:21*	*12/03/18 11:33*	*1*

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2440		ug/Kg		73	58 - 101
1,2-Dichlorobenzene	3330	2440		ug/Kg		73	57 - 99
1,3-Dichlorobenzene	3330	2420		ug/Kg		73	55 - 98
1,4-Dichlorobenzene	3330	2500		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2540		ug/Kg		76	56 - 109
2,4,6-Trichlorophenol	3330	2660		ug/Kg		80	56 - 110
2,4-Dichlorophenol	3330	2690		ug/Kg		81	57 - 99
2,4-Dimethylphenol	3330	2480		ug/Kg		74	53 - 97
2,4-Dinitrophenol	3330	2140		ug/Kg		64	10 - 89
2,4-Dinitrotoluene	3330	2610		ug/Kg		78	54 - 105
2,6-Dinitrotoluene	3330	2520		ug/Kg		76	55 - 105
2-Chloronaphthalene	3330	2560		ug/Kg		77	56 - 111
2-Chlorophenol	3330	2590		ug/Kg		78	56 - 99
2-Methylnaphthalene	3330	2590		ug/Kg		78	58 - 98
2-Methylphenol	3330	2540		ug/Kg		76	53 - 97
2-Nitroaniline	3330	2480		ug/Kg		74	55 - 108
2-Nitrophenol	3330	2420		ug/Kg		73	59 - 104
3 & 4 Methylphenol	3330	2950		ug/Kg		88	58 - 108
3,3'-Dichlorobenzidine	3330	2160		ug/Kg		65	42 - 104
3-Nitroaniline	3330	2310		ug/Kg		69	43 - 96
4,6-Dinitro-2-methylphenol	3330	2520		ug/Kg		76	19 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Bromophenyl phenyl ether	3330	2660		ug/Kg		80	58 - 109
4-Chloro-3-methylphenol	3330	2630		ug/Kg		79	54 - 98
4-Chloroaniline	3330	2060		ug/Kg		62	41 - 83
4-Chlorophenyl phenyl ether	3330	2600		ug/Kg		78	55 - 105
4-Nitroaniline	3330	2690		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2470		ug/Kg		74	48 - 106
Acenaphthene	3330	2630		ug/Kg		79	55 - 106
Acenaphthylene	3330	2580		ug/Kg		78	56 - 109
Anthracene	3330	2640		ug/Kg		79	56 - 103
Benzo[a]anthracene	3330	2700		ug/Kg		81	56 - 107
Benzo[a]pyrene	3330	2670		ug/Kg		80	57 - 109
Benzo[b]fluoranthene	3330	2620		ug/Kg		79	68 - 109
Benzo[g,h,i]perylene	3330	2490		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2530		ug/Kg		76	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2380		ug/Kg		71	49 - 94
Bis(2-chloroethoxy)methane	3330	2540		ug/Kg		76	56 - 99
Bis(2-chloroethyl)ether	3330	2310		ug/Kg		69	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2760		ug/Kg		83	59 - 113
Butyl benzyl phthalate	3330	2710		ug/Kg		81	60 - 112
Carbazole	3330	2680		ug/Kg		80	53 - 98
Chrysene	3330	2670		ug/Kg		80	54 - 107
Dibenz(a,h)anthracene	3330	2590		ug/Kg		78	52 - 126
Dibenzofuran	3330	2570		ug/Kg		77	55 - 103
Diethylphthalate	3330	2730		ug/Kg		82	54 - 101
Di-n-butyl phthalate	3330	2760		ug/Kg		83	57 - 102
Di-n-octyl phthalate	3330	2940		ug/Kg		88	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3170		ug/Kg		95	63 - 121
Fluoranthene	3330	2620		ug/Kg		79	54 - 100
Fluorene	3330	2680		ug/Kg		80	57 - 106
Hexachlorobenzene	3330	2700		ug/Kg		81	57 - 109
Hexachlorobutadiene	3330	2580		ug/Kg		77	59 - 106
Hexachlorocyclopentadiene	3330	2140		ug/Kg		64	44 - 140
Hexachloroethane	3330	2360		ug/Kg		71	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2610		ug/Kg		78	52 - 132
Isophorone	3330	2380		ug/Kg		71	55 - 96
Naphthalene	3330	2520		ug/Kg		76	57 - 98
Nitrobenzene	3330	2570		ug/Kg		77	58 - 102
N-Nitrosodi-n-propylamine	3330	2590		ug/Kg		78	54 - 98
Pentachlorophenol	3330	2600		ug/Kg		78	35 - 107
Phenanthrene	3330	2670		ug/Kg		80	57 - 103
Phenol	3330	2560		ug/Kg		77	50 - 96
Pyrene	3330	2650		ug/Kg		80	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*
2-Fluorophenol (Surr)	*76*		*54 - 102*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-401921/2-A
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401921

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*82*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-31884-F-10-B MS
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	350	U D	3520	2550	J D	ug/Kg	☼	72	52 - 103
1,2-Dichlorobenzene - DL	370	U D	3520	2360	J D	ug/Kg	☼	67	50 - 98
1,3-Dichlorobenzene - DL	390	U D	3520	2340	J D	ug/Kg	☼	66	49 - 96
1,4-Dichlorobenzene - DL	390	U D	3520	2440	J D	ug/Kg	☼	69	50 - 96
2,4,5-Trichlorophenol - DL	550	U D	3520	2630	J D	ug/Kg	☼	75	41 - 116
2,4,6-Trichlorophenol - DL	480	U D	3520	2540	J D	ug/Kg	☼	72	40 - 115
2,4-Dichlorophenol - DL	410	U D	3520	2480	J D	ug/Kg	☼	70	47 - 104
2,4-Dimethylphenol - DL	580	U D	3520	2540	J D	ug/Kg	☼	72	45 - 105
2,4-Dinitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	10 - 100
2,4-Dinitrotoluene - DL	1300	U D	3520	2590	J D	ug/Kg	☼	74	42 - 113
2,6-Dinitrotoluene - DL	660	U D	3520	2440	J D	ug/Kg	☼	69	46 - 109
2-Chloronaphthalene - DL	390	U D	3520	2600	J D	ug/Kg	☼	74	52 - 108
2-Chlorophenol - DL	400	U D	3520	2450	J D	ug/Kg	☼	69	48 - 102
2-Methylnaphthalene - DL	420	U D	3520	2590	J D	ug/Kg	☼	74	55 - 97
2-Methylphenol - DL	450	U D	3520	2550	J D	ug/Kg	☼	72	46 - 98
2-Nitroaniline - DL	1300	U D	3520	2730	J D	ug/Kg	☼	78	45 - 111
2-Nitrophenol - DL	1500	U D	3520	2180	J D	ug/Kg	☼	62	38 - 115
3 & 4 Methylphenol - DL	700	U D	3520	2780	J D	ug/Kg	☼	79	48 - 111
3,3'-Dichlorobenzidine - DL	1200	U D	3520	2440	J D	ug/Kg	☼	69	23 - 102
3-Nitroaniline - DL	1100	U D	3520	2500	J D	ug/Kg	☼	71	32 - 95
4,6-Dinitro-2-methylphenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	15 - 118
4-Bromophenyl phenyl ether - DL	510	U D	3520	2490	J D	ug/Kg	☼	71	53 - 110
4-Chloro-3-methylphenol - DL	440	U D	3520	2440	J D	ug/Kg	☼	69	36 - 111
4-Chloroaniline - DL	490	U D	3520	1980	J D	ug/Kg	☼	56	32 - 79
4-Chlorophenyl phenyl ether - DL	450	U D	3520	2630	J D	ug/Kg	☼	75	51 - 103
4-Nitroaniline - DL	780	U D	3520	2560	J D	ug/Kg	☼	73	36 - 102
4-Nitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	40 - 113
Acenaphthene - DL	370	U D	3520	2630	J D	ug/Kg	☼	75	53 - 105
Acenaphthylene - DL	480	U D	3520	2430	J D	ug/Kg	☼	69	55 - 107
Anthracene - DL	520	U D	3520	2500	J D	ug/Kg	☼	71	55 - 103
Benzo[a]anthracene - DL	630	U D	3520	2640	J D	ug/Kg	☼	75	48 - 112
Benzo[a]pyrene - DL	940	U D	3520	2830	J D	ug/Kg	☼	80	46 - 117
Benzo[b]fluoranthene - DL	350	U D	3520	2770	J D	ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene - DL	350	U D	3520	2760	J D	ug/Kg	☼	78	24 - 134
Benzo[k]fluoranthene - DL	840	U D	3520	2710	J D	ug/Kg	☼	77	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	440	U D	3520	2250	J D	ug/Kg	☼	64	38 - 98

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-F-10-B MS
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-chloroethoxy)methane - DL	400	U D	3520	2390	J D	ug/Kg	☼	68	49 - 100
Bis(2-chloroethyl)ether - DL	350	U D	3520	2400	J D	ug/Kg	☼	68	49 - 100
Bis(2-ethylhexyl) phthalate - DL	900	U D	3520	3200	J D	ug/Kg	☼	91	50 - 113
Butyl benzyl phthalate - DL	970	U D	3520	3030	J D	ug/Kg	☼	86	54 - 112
Carbazole - DL	500	U D	3520	2550	J D	ug/Kg	☼	72	47 - 102
Chrysene - DL	480	U D	3520	2700	J D	ug/Kg	☼	77	45 - 115
Dibenz(a,h)anthracene - DL	690	U D	3520	2850	J D	ug/Kg	☼	81	30 - 134
Dibenzofuran - DL	430	U D	3520	2600	J D	ug/Kg	☼	74	50 - 102
Diethylphthalate - DL	860	U D	3520	2800	J D	ug/Kg	☼	80	46 - 107
Di-n-butyl phthalate - DL	670	U D	3520	2890	J D	ug/Kg	☼	82	49 - 107
Di-n-octyl phthalate - DL	1400	U D	3520	3250	J D	ug/Kg	☼	92	35 - 125
Diphenylamine + N-Nitrosodiphenylamine - DL	350	U D	3520	3070	J D	ug/Kg	☼	87	33 - 140
Fluoranthene - DL	530	U D	3520	2960	J D	ug/Kg	☼	84	45 - 109
Fluorene - DL	480	U D	3520	2720	J D	ug/Kg	☼	77	45 - 109
Hexachlorobenzene - DL	440	U D	3520	2490	J D	ug/Kg	☼	71	48 - 113
Hexachlorobutadiene - DL	420	U D	3520	2770	J D	ug/Kg	☼	79	48 - 109
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144
Hexachloroethane - DL	360	U D	3520	2410	J D	ug/Kg	☼	68	44 - 102
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	2970	J D	ug/Kg	☼	84	30 - 136
Isophorone - DL	390	U D	3520	2140	J D	ug/Kg	☼	61	48 - 100
Naphthalene - DL	370	U D	3520	2480	J D	ug/Kg	☼	71	54 - 98
Nitrobenzene - DL	420	U D	3520	2460	J D	ug/Kg	☼	70	51 - 106
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2460	J D	ug/Kg	☼	70	47 - 104
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116
Phenanthrene - DL	450	U D	3520	2690	J D	ug/Kg	☼	76	53 - 106
Phenol - DL	400	U D	3520	2380	J D	ug/Kg	☼	68	41 - 100
Pyrene - DL	770	U D	3520	2980	J D	ug/Kg	☼	85	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*64*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*72*		*59 - 110*
2-Fluorophenol (Surr) - DL	*70*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*65*		*44 - 120*
Phenol-d5 (Surr) - DL	*70*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*85*		*59 - 98*

Lab Sample ID: 160-31884-F-10-C MSD
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	350	U D	3520	2570	J D	ug/Kg	☼	73	52 - 103	1	30
1,2-Dichlorobenzene - DL	370	U D	3520	2680	J D	ug/Kg	☼	76	50 - 98	12	30
1,3-Dichlorobenzene - DL	390	U D	3520	2390	J D	ug/Kg	☼	68	49 - 96	2	30
1,4-Dichlorobenzene - DL	390	U D	3520	2490	J D	ug/Kg	☼	71	50 - 96	2	30
2,4,5-Trichlorophenol - DL	550	U D	3520	3130	J D	ug/Kg	☼	89	41 - 116	17	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-F-10-C MSD
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,6-Trichlorophenol - DL	480	U D	3520	2860	J D	ug/Kg	☼	81	40 - 115	12	30
2,4-Dichlorophenol - DL	410	U D	3520	2790	J D	ug/Kg	☼	79	47 - 104	12	30
2,4-Dimethylphenol - DL	580	U D	3520	2610	J D	ug/Kg	☼	74	45 - 105	3	30
2,4-Dinitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	10 - 100	NC	30
2,4-Dinitrotoluene - DL	1300	U D	3520	2960	J D	ug/Kg	☼	84	42 - 113	13	30
2,6-Dinitrotoluene - DL	660	U D	3520	2410	J D	ug/Kg	☼	69	46 - 109	1	30
2-Chloronaphthalene - DL	390	U D	3520	2640	J D	ug/Kg	☼	75	52 - 108	1	30
2-Chlorophenol - DL	400	U D	3520	2680	J D	ug/Kg	☼	76	48 - 102	9	30
2-Methylnaphthalene - DL	420	U D	3520	2760	J D	ug/Kg	☼	78	55 - 97	6	30
2-Methylphenol - DL	450	U D	3520	2360	J D	ug/Kg	☼	67	46 - 98	8	30
2-Nitroaniline - DL	1300	U D	3520	2940	J D	ug/Kg	☼	84	45 - 111	7	30
2-Nitrophenol - DL	1500	U D	3520	2670	J D	ug/Kg	☼	76	38 - 115	20	30
3 & 4 Methylphenol - DL	700	U D	3520	3050	J D	ug/Kg	☼	87	48 - 111	9	30
3,3'-Dichlorobenzidine - DL	1200	U D	3520	2650	J D	ug/Kg	☼	75	23 - 102	8	30
3-Nitroaniline - DL	1100	U D	3520	2730	J D	ug/Kg	☼	77	32 - 95	9	30
4,6-Dinitro-2-methylphenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	15 - 118	NC	30
4-Bromophenyl phenyl ether - DL	510	U D	3520	2680	J D	ug/Kg	☼	76	53 - 110	8	30
4-Chloro-3-methylphenol - DL	440	U D	3520	2800	J D	ug/Kg	☼	79	36 - 111	14	30
4-Chloroaniline - DL	490	U D	3520	1890	J D	ug/Kg	☼	54	32 - 79	5	30
4-Chlorophenyl phenyl ether - DL	450	U D	3520	2880	J D	ug/Kg	☼	82	51 - 103	9	30
4-Nitroaniline - DL	780	U D	3520	2850	J D	ug/Kg	☼	81	36 - 102	10	30
4-Nitrophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	40 - 113	NC	30
Acenaphthene - DL	370	U D	3520	2740	J D	ug/Kg	☼	78	53 - 105	4	30
Acenaphthylene - DL	480	U D	3520	2540	J D	ug/Kg	☼	72	55 - 107	4	30
Anthracene - DL	520	U D	3520	2650	J D	ug/Kg	☼	75	55 - 103	6	30
Benzo[a]anthracene - DL	630	U D	3520	2970	J D	ug/Kg	☼	84	48 - 112	12	30
Benzo[a]pyrene - DL	940	U D	3520	2990	J D	ug/Kg	☼	85	46 - 117	5	30
Benzo[b]fluoranthene - DL	350	U D	3520	2890	J D	ug/Kg	☼	82	45 - 125	4	30
Benzo[g,h,i]perylene - DL	350	U D	3520	2930	J D	ug/Kg	☼	83	24 - 134	6	30
Benzo[k]fluoranthene - DL	840	U D	3520	2920	J D	ug/Kg	☼	83	43 - 114	8	30
bis(2 chloro-1-methylethyl) ether - DL	440	U D	3520	2610	J D	ug/Kg	☼	74	38 - 98	15	30
Bis(2-chloroethoxy)methane - DL	400	U D	3520	2750	J D	ug/Kg	☼	78	49 - 100	14	30
Bis(2-chloroethyl)ether - DL	350	U D	3520	2470	J D	ug/Kg	☼	70	49 - 100	3	30
Bis(2-ethylhexyl) phthalate - DL	900	U D	3520	3450	J D	ug/Kg	☼	98	50 - 113	7	30
Butyl benzyl phthalate - DL	970	U D	3520	3480	J D	ug/Kg	☼	99	54 - 112	14	30
Carbazole - DL	500	U D	3520	2820	J D	ug/Kg	☼	80	47 - 102	10	30
Chrysene - DL	480	U D	3520	2830	J D	ug/Kg	☼	80	45 - 115	5	30
Dibenz(a,h)anthracene - DL	690	U D	3520	3040	J D	ug/Kg	☼	86	30 - 134	6	30
Dibenzofuran - DL	430	U D	3520	2820	J D	ug/Kg	☼	80	50 - 102	8	30
Diethylphthalate - DL	860	U D	3520	3110	J D	ug/Kg	☼	88	46 - 107	10	30
Di-n-butyl phthalate - DL	670	U D	3520	3050	J D	ug/Kg	☼	87	49 - 107	6	30
Di-n-octyl phthalate - DL	1400	U D	3520	3620	D	ug/Kg	☼	103	35 - 125	11	30
Diphenylamine + N-Nitrosodiphenylamine - DL	350	U D	3520	3220	J D	ug/Kg	☼	91	33 - 140	5	30
Fluoranthene - DL	530	U D	3520	3070	J D	ug/Kg	☼	87	45 - 109	3	30
Fluorene - DL	480	U D	3520	2980	J D	ug/Kg	☼	85	45 - 109	9	30
Hexachlorobenzene - DL	440	U D	3520	2360	J D	ug/Kg	☼	67	48 - 113	5	30
Hexachlorobutadiene - DL	420	U D	3520	2660	J D	ug/Kg	☼	75	48 - 109	4	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-F-10-C MSD
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144	NC	30
Hexachloroethane - DL	360	U D	3520	2270	J D	ug/Kg	☼	64	44 - 102	6	30
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	3130	J D	ug/Kg	☼	89	30 - 136	5	30
Isophorone - DL	390	U D	3520	2500	J D	ug/Kg	☼	71	48 - 100	16	30
Naphthalene - DL	370	U D	3520	2700	J D	ug/Kg	☼	77	54 - 98	8	30
Nitrobenzene - DL	420	U D	3520	2740	J D	ug/Kg	☼	78	51 - 106	11	30
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2560	J D	ug/Kg	☼	73	47 - 104	4	30
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116	NC	30
Phenanthrene - DL	450	U D	3520	2890	J D	ug/Kg	☼	82	53 - 106	7	30
Phenol - DL	400	U D	3520	2590	J D	ug/Kg	☼	73	41 - 100	8	30
Pyrene - DL	770	U D	3520	3140	J D	ug/Kg	☼	89	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*57*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*75*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*87*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-401823/1-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Toxaphene	23	U	67	23	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31889-7 - DL	B3L1K6	62	78	71	64	77	86
160-31889-8 - DL	B3L1J4	62	84	82	63	84	95
160-31889-9 - DL	B3L1M1	57	80	77	66	77	85
160-31889-10 - DL	B3L1M7	67	74	80	71	79	91
160-31889-11	B3L1J1	70	86	83	70	82	85
160-31889-12	B3L1K9	77	82	81	71	80	86
160-31889-18	B3L1P5	71	83	85	71	83	88
160-31889-19 - DL	B3L1N0	70	79	82	68	83	92
160-31889-20 - DL	B3L1R4	68	80	76	67	76	91
160-31889-21 - DL	B3L1K3	65	86	82	70	80	87
160-31889-22	B3L1R7	72	83	78	69	78	96

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31884-F-10-B MS - DL	Matrix Spike	64	72	70	65	70	85
160-31884-F-10-C MSD - DL	Matrix Spike Duplicate	57	77	76	73	75	87
LCS 160-401921/2-A	Lab Control Sample	80	77	76	75	78	82
MB 160-401921/1-A	Method Blank	69	80	76	67	75	82

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31889-1	B3L1M6	92	86
160-31889-2	B3L1M0	100	92
160-31889-3	B3L1R3	90	89
160-31889-4	B3L1K5	93	87

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-2 MSD
Matrix: Soil
Analysis Batch: 405466

Client Sample ID: B3L1N6
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromodichloromethane	0.60	U Z	47.6	50.1		ug/Kg	☼	105	80 - 120	2	20
Bromoform	2.3	U Z	47.6	50.2		ug/Kg	☼	105	80 - 125	1	20
Bromomethane	2.9	U Z	47.6	48.0		ug/Kg	☼	101	70 - 126	2	20
Carbon disulfide	0.83	U Z T	47.6	47.9	y	ug/Kg	☼	101	79 - 121	31	20
Carbon tetrachloride	0.62	U Z	47.6	48.8		ug/Kg	☼	103	80 - 120	2	20
Chlorobenzene	0.98	U Z	47.6	47.9		ug/Kg	☼	101	80 - 120	3	20
Chloroethane	2.4	U Z	47.6	44.4		ug/Kg	☼	93	64 - 133	10	20
Chloroform	0.46	U Z	47.6	47.4		ug/Kg	☼	99	80 - 120	4	20
Chloromethane	0.79	U Z	47.6	56.9		ug/Kg	☼	120	75 - 120	1	20
cis-1,3-Dichloropropene	2.6	U Z	47.6	52.7		ug/Kg	☼	111	80 - 120	3	20
Dibromochloromethane	1.5	U Z	47.6	49.7		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.83	U Z	47.6	47.7		ug/Kg	☼	100	80 - 120	3	20
Methylene Chloride	1.9	U Z	47.6	50.2		ug/Kg	☼	105	77 - 123	0	20
Styrene	2.4	U Z	47.6	51.9		ug/Kg	☼	109	80 - 120	2	20
Tetrachloroethene	0.68	U Z	47.6	46.4		ug/Kg	☼	97	80 - 120	3	20
Toluene	3.0	U Z	47.6	52.4		ug/Kg	☼	110	80 - 124	2	20
trans-1,3-Dichloropropene	2.1	U Z	47.6	50.9		ug/Kg	☼	107	80 - 122	3	20
Trichloroethene	0.47	U Z	47.6	51.2		ug/Kg	☼	108	79 - 120	0	20
Vinyl chloride	0.52	U Z	47.6	51.4		ug/Kg	☼	108	71 - 120	1	20
Xylenes, Total	1.0	U Z	95.3	104		ug/Kg	☼	109	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Methylphenol	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Picoline	45	U	660	45	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acenaphthene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acenaphthylene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acetophenone	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Aniline	60	U	330	60	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Anthracene	49	U	330	49	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Aramite	330	U	660	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Carbazole	47	U	330	47	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chrysene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diallate	67	U	660	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dibenzofuran	41	U	330	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diethylphthalate	82	U	330	82	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dimethoate	100	U	660	100	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dinoseb	330	U	660	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Disulfoton	41	U	1600	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Famphur	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Fluoranthene	50	U	330	50	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Fluorene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachloroethane	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isodrin	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isophorone	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isosafrole	67	U	660	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Kepone	330	U	3300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methapyrilene	140	U	1600	140	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methyl parathion	120	U	1600	120	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Naphthalene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Nitrobenzene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
o-Toluidine	51	U	330	51	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Parathion	98	U	1600	98	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachloroethane	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenacetin	54	U	660	54	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenanthrene	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenol	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phorate	37	U	1600	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pronamide	53	U	660	53	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pyrene	73	U	330	73	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pyridine	71	U	660	71	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Safrole	33	U	660	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*548*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*9730*	*N*	*ug/Kg*		*4.60*		*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*705*	*N*	*ug/Kg*		*5.14*		*11/26/18 15:48*	*12/04/18 14:04*	*1*
n-Hexadecanoic acid	*267*	*N J*	*ug/Kg*		*10.98*	*57-10-3*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*214*	*N*	*ug/Kg*		*13.88*		*11/26/18 15:48*	*12/04/18 14:04*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*69*		*47 - 125*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
2-Fluorobiphenyl (Surr)	*79*		*59 - 110*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
2-Fluorophenol (Surr)	*79*		*54 - 102*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Nitrobenzene-d5 (Surr)	*69*		*44 - 120*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Phenol-d5 (Surr)	*78*		*51 - 104*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Terphenyl-d14 (Surr)	*87*		*59 - 98*	*11/26/18 15:48*	*12/04/18 14:04*	*1*

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2480		ug/Kg		74	58 - 101
1,2-Dichlorobenzene	3330	2440		ug/Kg		73	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2450		ug/Kg		73	56 - 98
2,4,5-Trichlorophenol	3330	2720		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2800		ug/Kg		84	56 - 110
2,4-Dichlorophenol	3330	2750		ug/Kg		83	57 - 99
2,4-Dimethylphenol	3330	2660		ug/Kg		80	53 - 97
2,4-Dinitrophenol	3330	2420		ug/Kg		73	10 - 89
2,4-Dinitrotoluene	3330	2770		ug/Kg		83	54 - 105
2,6-Dinitrotoluene	3330	2600		ug/Kg		78	55 - 105

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloronaphthalene	3330	2750		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2700		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2730		ug/Kg		82	58 - 98
2-Methylphenol	3330	2630		ug/Kg		79	53 - 97
2-Nitroaniline	3330	2540		ug/Kg		76	55 - 108
2-Nitrophenol	3330	2650		ug/Kg		79	59 - 104
3 & 4 Methylphenol	3330	3060		ug/Kg		92	58 - 108
3,3'-Dichlorobenzidine	3330	2210		ug/Kg		66	42 - 104
3-Nitroaniline	3330	2440		ug/Kg		73	43 - 96
4,6-Dinitro-2-methylphenol	3330	2970		ug/Kg		89	19 - 102
4-Bromophenyl phenyl ether	3330	2760		ug/Kg		83	58 - 109
4-Chloro-3-methylphenol	3330	2710		ug/Kg		81	54 - 98
4-Chloroaniline	3330	2160		ug/Kg		65	41 - 83
4-Chlorophenyl phenyl ether	3330	2770		ug/Kg		83	55 - 105
4-Nitroaniline	3330	2750		ug/Kg		82	49 - 99
4-Nitrophenol	3330	2650		ug/Kg		79	48 - 106
Acenaphthene	3330	2790		ug/Kg		84	55 - 106
Acenaphthylene	3330	2730		ug/Kg		82	56 - 109
Anthracene	3330	2820		ug/Kg		85	56 - 103
Benzo[a]anthracene	3330	2730		ug/Kg		82	56 - 107
Benzo[a]pyrene	3330	2720		ug/Kg		82	57 - 109
Benzo[b]fluoranthene	3330	2700		ug/Kg		81	68 - 109
Benzo[g,h,i]perylene	3330	2500		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2700		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2340		ug/Kg		70	49 - 94
Bis(2-chloroethoxy)methane	3330	2710		ug/Kg		81	56 - 99
Bis(2-chloroethyl)ether	3330	2380		ug/Kg		72	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2770		ug/Kg		83	59 - 113
Butyl benzyl phthalate	3330	2710		ug/Kg		81	60 - 112
Carbazole	3330	2870		ug/Kg		86	53 - 98
Chrysene	3330	2740		ug/Kg		82	54 - 107
Dibenz(a,h)anthracene	3330	2540		ug/Kg		76	52 - 126
Dibenzofuran	3330	2750		ug/Kg		83	55 - 103
Diethylphthalate	3330	2790		ug/Kg		84	54 - 101
Di-n-butyl phthalate	3330	2830		ug/Kg		85	57 - 102
Di-n-octyl phthalate	3330	2930		ug/Kg		88	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3330		ug/Kg		100	63 - 121
Fluoranthene	3330	2820		ug/Kg		85	54 - 100
Fluorene	3330	2840		ug/Kg		85	57 - 106
Hexachlorobenzene	3330	2860		ug/Kg		86	57 - 109
Hexachlorobutadiene	3330	2680		ug/Kg		80	59 - 106
Hexachlorocyclopentadiene	3330	2570		ug/Kg		77	44 - 140
Hexachloroethane	3330	2380		ug/Kg		71	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2600		ug/Kg		78	52 - 132
Isophorone	3330	2510		ug/Kg		75	55 - 96
Naphthalene	3330	2650		ug/Kg		79	57 - 98
Nitrobenzene	3330	2670		ug/Kg		80	58 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-Nitrosodi-n-propylamine	3330	2690		ug/Kg		81	54 - 98
Pentachlorophenol	3330	2660		ug/Kg		80	35 - 107
Phenanthrene	3330	2850		ug/Kg		86	57 - 103
Phenol	3330	2710		ug/Kg		81	50 - 96
Pyrene	3330	2730		ug/Kg		82	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*82*		*51 - 104*
Terphenyl-d14 (Surr)	*80*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-31915-1 MS
Matrix: Soil
Analysis Batch: 403968

Client Sample ID: B3L1P2
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	170	U D	3420	2460	D	ug/Kg	☼	72	52 - 103
1,2-Dichlorobenzene - DL	180	U D	3420	2340	D	ug/Kg	☼	69	50 - 98
1,3-Dichlorobenzene - DL	190	U D	3420	2270	D	ug/Kg	☼	66	49 - 96
1,4-Dichlorobenzene - DL	190	U D	3420	2360	D	ug/Kg	☼	69	50 - 96
2,4,5-Trichlorophenol - DL	270	U D	3420	2660	D	ug/Kg	☼	78	41 - 116
2,4,6-Trichlorophenol - DL	230	U D	3420	2690	D	ug/Kg	☼	79	40 - 115
2,4-Dichlorophenol - DL	200	U D	3420	2810	D	ug/Kg	☼	82	47 - 104
2,4-Dimethylphenol - DL	280	U D	3420	2470	D	ug/Kg	☼	72	45 - 105
2,4-Dinitrophenol - DL	1700	U D	3420	2130	J D	ug/Kg	☼	62	10 - 100
2,4-Dinitrotoluene - DL	640	U D	3420	2720	D	ug/Kg	☼	80	42 - 113
2,6-Dinitrotoluene - DL	320	U D	3420	2520	D	ug/Kg	☼	74	46 - 109
2-Chloronaphthalene - DL	190	U D	3420	2720	D	ug/Kg	☼	80	52 - 108
2-Chlorophenol - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 102
2-Methylnaphthalene - DL	210	U D	3420	2610	D	ug/Kg	☼	76	55 - 97
2-Methylphenol - DL	220	U D	3420	2500	D	ug/Kg	☼	73	46 - 98
2-Nitroaniline - DL	610	U D	3420	2720	D	ug/Kg	☼	80	45 - 111
2-Nitrophenol - DL	740	U D	3420	2380	D	ug/Kg	☼	70	38 - 115
3 & 4 Methylphenol - DL	340	U D	3420	3010	J D	ug/Kg	☼	88	48 - 111
3,3'-Dichlorobenzidine - DL	580	U D	3420	2070	J D	ug/Kg	☼	61	23 - 102
3-Nitroaniline - DL	520	U D	3420	2470	D	ug/Kg	☼	72	32 - 95
4,6-Dinitro-2-methylphenol - DL	1700	U D	3420	2610	J D	ug/Kg	☼	76	15 - 118
4-Bromophenyl phenyl ether - DL	250	U D	3420	2670	D	ug/Kg	☼	78	53 - 110
4-Chloro-3-methylphenol - DL	220	U D	3420	2700	D	ug/Kg	☼	79	36 - 111
4-Chloroaniline - DL	240	U D	3420	1930	D	ug/Kg	☼	57	32 - 79
4-Chlorophenyl phenyl ether - DL	220	U D	3420	2630	D	ug/Kg	☼	77	51 - 103
4-Nitroaniline - DL	380	U D	3420	2780	J D	ug/Kg	☼	81	36 - 102
4-Nitrophenol - DL	1700	U D	3420	2650	J D	ug/Kg	☼	78	40 - 113

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-1 MS
Matrix: Soil
Analysis Batch: 403968

Client Sample ID: B3L1P2
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene - DL	180	U D	3420	2670	D	ug/Kg	☼	78	53 - 105
Acenaphthylene - DL	230	U D	3420	2590	D	ug/Kg	☼	76	55 - 107
Anthracene - DL	250	U D	3420	2660	D	ug/Kg	☼	78	55 - 103
Benzo[a]anthracene - DL	300	U D	3420	2720	D	ug/Kg	☼	80	48 - 112
Benzo[a]pyrene - DL	460	U D	3420	2750	D	ug/Kg	☼	81	46 - 117
Benzo[b]fluoranthene - DL	170	U D	3420	2710	D	ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene - DL	170	U D	3420	3580	D	ug/Kg	☼	105	24 - 134
Benzo[k]fluoranthene - DL	410	U D	3420	2720	D	ug/Kg	☼	80	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	210	U D	3420	2370	D	ug/Kg	☼	69	38 - 98
Bis(2-chloroethoxy)methane - DL	190	U D	3420	2670	D	ug/Kg	☼	78	49 - 100
Bis(2-chloroethyl)ether - DL	170	U D	3420	2510	D	ug/Kg	☼	74	49 - 100
Bis(2-ethylhexyl) phthalate - DL	440	U D	3420	3030	D	ug/Kg	☼	89	50 - 113
Butyl benzyl phthalate - DL	470	U D	3420	3080	D	ug/Kg	☼	90	54 - 112
Carbazole - DL	240	U D	3420	2780	D	ug/Kg	☼	82	47 - 102
Chrysene - DL	230	U D	3420	2750	D	ug/Kg	☼	80	45 - 115
Dibenz(a,h)anthracene - DL	340	U D	3420	3230	D	ug/Kg	☼	94	30 - 134
Dibenzofuran - DL	210	U D	3420	2700	D	ug/Kg	☼	79	50 - 102
Diethylphthalate - DL	420	U D	3420	2840	D	ug/Kg	☼	83	46 - 107
Di-n-butyl phthalate - DL	330	U D	3420	2870	D	ug/Kg	☼	84	49 - 107
Di-n-octyl phthalate - DL	680	U D	3420	3140	D	ug/Kg	☼	92	35 - 125
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3220	D	ug/Kg	☼	94	33 - 140
Fluoranthene - DL	260	U D	3420	2890	D	ug/Kg	☼	85	45 - 109
Fluorene - DL	230	U D	3420	2760	D	ug/Kg	☼	81	45 - 109
Hexachlorobenzene - DL	220	U D	3420	2640	D	ug/Kg	☼	77	48 - 113
Hexachlorobutadiene - DL	200	U D	3420	2620	D	ug/Kg	☼	77	48 - 109
Hexachlorocyclopentadiene - DL	1700	U D	3420	2170	J D	ug/Kg	☼	64	21 - 144
Hexachloroethane - DL	180	U D	3420	2310	D	ug/Kg	☼	68	44 - 102
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3380	D	ug/Kg	☼	99	30 - 136
Isophorone - DL	190	U D	3420	2420	D	ug/Kg	☼	71	48 - 100
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98
Nitrobenzene - DL	210	U D	3420	2680	D	ug/Kg	☼	78	51 - 106
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2620	D	ug/Kg	☼	77	47 - 104
Pentachlorophenol - DL	1700	U D	3420	2500	J D	ug/Kg	☼	73	23 - 116
Phenanthrene - DL	220	U D	3420	2780	D	ug/Kg	☼	82	53 - 106
Phenol - DL	190	U D	3420	2700	D	ug/Kg	☼	79	41 - 100
Pyrene - DL	370	U D	3420	2780	D	ug/Kg	☼	81	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*63*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*81*		*59 - 110*
2-Fluorophenol (Surr) - DL	*75*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*76*		*44 - 120*
Phenol-d5 (Surr) - DL	*76*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*82*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-1 MSD
Matrix: Soil
Analysis Batch: 403968

Client Sample ID: B3L1P2
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	170	U D	3420	2380	D	ug/Kg	☼	70	52 - 103	3	30
1,2-Dichlorobenzene - DL	180	U D	3420	2430	D	ug/Kg	☼	71	50 - 98	4	30
1,3-Dichlorobenzene - DL	190	U D	3420	2380	D	ug/Kg	☼	70	49 - 96	5	30
1,4-Dichlorobenzene - DL	190	U D	3420	2330	D	ug/Kg	☼	68	50 - 96	1	30
2,4,5-Trichlorophenol - DL	270	U D	3420	2710	D	ug/Kg	☼	79	41 - 116	2	30
2,4,6-Trichlorophenol - DL	230	U D	3420	2750	D	ug/Kg	☼	81	40 - 115	2	30
2,4-Dichlorophenol - DL	200	U D	3420	2740	D	ug/Kg	☼	80	47 - 104	2	30
2,4-Dimethylphenol - DL	280	U D	3420	2720	D	ug/Kg	☼	80	45 - 105	10	30
2,4-Dinitrophenol - DL	1700	U D	3420	1860	J D	ug/Kg	☼	54	10 - 100	13	30
2,4-Dinitrotoluene - DL	640	U D	3420	2850	D	ug/Kg	☼	84	42 - 113	5	30
2,6-Dinitrotoluene - DL	320	U D	3420	2660	D	ug/Kg	☼	78	46 - 109	5	30
2-Chloronaphthalene - DL	190	U D	3420	2750	D	ug/Kg	☼	80	52 - 108	1	30
2-Chlorophenol - DL	200	U D	3420	2690	D	ug/Kg	☼	79	48 - 102	6	30
2-Methylnaphthalene - DL	210	U D	3420	2710	D	ug/Kg	☼	79	55 - 97	4	30
2-Methylphenol - DL	220	U D	3420	2710	D	ug/Kg	☼	79	46 - 98	8	30
2-Nitroaniline - DL	610	U D	3420	2650	D	ug/Kg	☼	78	45 - 111	2	30
2-Nitrophenol - DL	740	U D	3420	2610	D	ug/Kg	☼	76	38 - 115	9	30
3 & 4 Methylphenol - DL	340	U D	3420	3000	J D	ug/Kg	☼	88	48 - 111	0	30
3,3'-Dichlorobenzidine - DL	580	U D	3420	2300	J D	ug/Kg	☼	67	23 - 102	11	30
3-Nitroaniline - DL	520	U D	3420	2520	D	ug/Kg	☼	74	32 - 95	2	30
4,6-Dinitro-2-methylphenol - DL	1700	U D	3420	2590	J D	ug/Kg	☼	76	15 - 118	1	30
4-Bromophenyl phenyl ether - DL	250	U D	3420	2840	D	ug/Kg	☼	83	53 - 110	6	30
4-Chloro-3-methylphenol - DL	220	U D	3420	2740	D	ug/Kg	☼	80	36 - 111	2	30
4-Chloroaniline - DL	240	U D	3420	1900	D	ug/Kg	☼	56	32 - 79	2	30
4-Chlorophenyl phenyl ether - DL	220	U D	3420	2650	D	ug/Kg	☼	78	51 - 103	1	30
4-Nitroaniline - DL	380	U D	3420	2860	J D	ug/Kg	☼	84	36 - 102	3	30
4-Nitrophenol - DL	1700	U D	3420	3030	J D	ug/Kg	☼	89	40 - 113	13	30
Acenaphthene - DL	180	U D	3420	2780	D	ug/Kg	☼	81	53 - 105	4	30
Acenaphthylene - DL	230	U D	3420	2700	D	ug/Kg	☼	79	55 - 107	4	30
Anthracene - DL	250	U D	3420	2760	D	ug/Kg	☼	81	55 - 103	4	30
Benzo[a]anthracene - DL	300	U D	3420	2850	D	ug/Kg	☼	83	48 - 112	5	30
Benzo[a]pyrene - DL	460	U D	3420	2920	D	ug/Kg	☼	86	46 - 117	6	30
Benzo[b]fluoranthene - DL	170	U D	3420	2880	D	ug/Kg	☼	84	45 - 125	6	30
Benzo[g,h,i]perylene - DL	170	U D	3420	3760	D	ug/Kg	☼	110	24 - 134	5	30
Benzo[k]fluoranthene - DL	410	U D	3420	2810	D	ug/Kg	☼	82	43 - 114	3	30
bis(2 chloro-1-methylethyl) ether - DL	210	U D	3420	2300	D	ug/Kg	☼	67	38 - 98	3	30
Bis(2-chloroethoxy)methane - DL	190	U D	3420	2670	D	ug/Kg	☼	78	49 - 100	0	30
Bis(2-chloroethyl)ether - DL	170	U D	3420	2290	D	ug/Kg	☼	67	49 - 100	9	30
Bis(2-ethylhexyl) phthalate - DL	440	U D	3420	3150	D	ug/Kg	☼	92	50 - 113	4	30
Butyl benzyl phthalate - DL	470	U D	3420	3230	D	ug/Kg	☼	95	54 - 112	5	30
Carbazole - DL	240	U D	3420	2960	D	ug/Kg	☼	87	47 - 102	6	30
Chrysene - DL	230	U D	3420	2820	D	ug/Kg	☼	83	45 - 115	3	30
Dibenz(a,h)anthracene - DL	340	U D	3420	3320	D	ug/Kg	☼	97	30 - 134	3	30
Dibenzofuran - DL	210	U D	3420	2820	D	ug/Kg	☼	83	50 - 102	4	30
Diethylphthalate - DL	420	U D	3420	2900	D	ug/Kg	☼	85	46 - 107	2	30
Di-n-butyl phthalate - DL	330	U D	3420	3080	D	ug/Kg	☼	90	49 - 107	7	30
Di-n-octyl phthalate - DL	680	U D	3420	3170	D	ug/Kg	☼	93	35 - 125	1	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-1 MSD
Matrix: Soil
Analysis Batch: 403968

Client Sample ID: B3L1P2
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3400	D	ug/Kg	☼	100	33 - 140	5	30
Fluoranthene - DL	260	U D	3420	3070	D	ug/Kg	☼	90	45 - 109	6	30
Fluorene - DL	230	U D	3420	3060	D	ug/Kg	☼	90	45 - 109	11	30
Hexachlorobenzene - DL	220	U D	3420	2890	D	ug/Kg	☼	85	48 - 113	9	30
Hexachlorobutadiene - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 109	3	30
Hexachlorocyclopentadiene - DL	1700	U D	3420	2080	J D	ug/Kg	☼	61	21 - 144	5	30
Hexachloroethane - DL	180	U D	3420	2330	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3580	D	ug/Kg	☼	105	30 - 136	6	30
Isophorone - DL	190	U D	3420	2450	D	ug/Kg	☼	72	48 - 100	1	30
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98	0	30
Nitrobenzene - DL	210	U D	3420	2570	D	ug/Kg	☼	75	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2700	D	ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol - DL	1700	U D	3420	2320	J D	ug/Kg	☼	68	23 - 116	8	30
Phenanthrene - DL	220	U D	3420	2950	D	ug/Kg	☼	86	53 - 106	6	30
Phenol - DL	190	U D	3420	2720	D	ug/Kg	☼	80	41 - 100	1	30
Pyrene - DL	370	U D	3420	2930	D	ug/Kg	☼	86	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*82*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*73*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*78*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31915-1 - DL	B3L1P2	67	80	75	69	81	90
160-31915-1 MS - DL	B3L1P2	63	81	75	76	76	82
160-31915-1 MSD - DL	B3L1P2	82	83	73	73	78	89
160-31915-2 - DL	B3L1N6	69	88	81	69	84	90
160-31915-3 - DL	B3L1N3	63	83	86	73	84	89
160-31915-4 - DL	B3L1N9	70	79	75	64	78	90
160-31915-5	B3L1H8	72	82	78	67	77	85
160-31915-6 - DL	B3L1J7	55	72	69	63	70	77
160-31915-7	B3L1T0	74	83	84	71	82	91
160-31915-9 - DL	B3L1R1	63	78	78	74	81	92
160-31915-10	B3L1M4	75	81	82	70	82	86
160-31915-19 - DL	B3L1L8	53	79	74	62	80	84
160-31915-20 - DL	B3L1L5	0 X	0 X	0 X	0 X	0 X	0 X
160-31915-21 - DL	B3L1H5	65	79	77	66	75	83
160-31915-22	B3L1L2	78	82	81	69	82	85
160-31915-23 - DL	B3L1K0	66	79	81	66	78	88

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-402691/2-A	Lab Control Sample	82	84	82	79	82	80
MB 160-402691/1-A	Method Blank	69	79	79	69	78	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31915-11	B3L1L1	98	90
160-31915-14	B3L1L4	115	83

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QC Summary

Report Date: November 20, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464556**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1823440											
QC1204161733 LCS											
Diesel Range Organics	66700				57500	UG/KG		86	(70%-130%)	LXA1	11/18/18 06:26
**o-Terphenyl	667				556	UG/KG		83	(50%-150%)		
QC1204161732 MB											
Diesel Range Organics				U	2160	UG/KG					11/18/18 05:47
**o-Terphenyl	666				485	UG/KG		73	(50%-150%)		
QC1204161736 464556012 MS											
Diesel Range Organics	68800	J	2400		69100	UG/KG		97	(70%-130%)		11/18/18 13:31
**o-Terphenyl	688		537		601	UG/KG		87	(50%-150%)		
QC1204161737 464556012 MSD											
Diesel Range Organics	68700	J	2400		72400	UG/KG	5	102	(0%-20%)		11/18/18 14:10
**o-Terphenyl	687		537		636	UG/KG		93	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL464556

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204161732	MB for batch 1823437	73
1204161733	LCS for batch 1823437	83
464556012	B3MMT9	78
1204161736	B3MMT9MS	87
1204161737	B3MMT9MSD	93
464556013	B3MMW9	80
464556014	B3MMV2	80
464556015	B3MMX0	84
464556016	B3MMW0	84
464556017	B3MMW1	77
464556018	B3MMV8	79
464556019	B3MMW6	71
464556020	B3MMV4	73
464556021	B3MMV3	83
464556022	B3MMT8	80

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: November 28, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464556**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics											
Batch 1825513											
QC1204166402 LCS											
Gasoline Range Organics	500				382	UG/KG		76	(70%-130%)	RXY1	11/26/18 12:36
**Bromofluorobenzene	50.0				34.7	UG/KG		69	(50%-150%)		
QC1204166400 MB											
Gasoline Range Organics				U	16.7	UG/KG					11/26/18 13:04
**Bromofluorobenzene	50.0				31.2	UG/KG		62	(50%-150%)		
QC1204166405 464556016 PS											
Gasoline Range Organics	500	TU	0.00	T	292	ug/L		58*	(70%-130%)		11/27/18 03:42
**Bromofluorobenzene	50.0		38.5		37.3	ug/L		75	(50%-150%)		
QC1204166407 464556016 PSD											
Gasoline Range Organics	500	TU	0.00	T	315	ug/L	8	63*	(0%-20%)		11/27/18 04:11
**Bromofluorobenzene	50.0		38.5		37.0	ug/L		74	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464556

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204166402	LCS for batch 1825511	69
1204166400	MB for batch 1825511	62
464556012	B3MMT9	67
464556013	B3MMW9	71
464556014	B3MMV2	89
464556015	B3MMX0	88
464556016	B3MMW0	77
464556017	B3MMW1	79
464556018	B3MMV8	73
464556019	B3MMW6	93
464556020	B3MMV4	74
464556021	B3MMV3	72
464556022	B3MMT8	78
1204166405	B3MMW0PS	75
1204166407	B3MMW0PSD	74

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 6, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464714**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1827953											
QC1204171853 LCS											
Diesel Range Organics	66600				67200	UG/KG		101	(70%-130%)	LXA1	12/04/18 20:37
**o-Terphenyl	666				601	UG/KG		90	(50%-150%)		
QC1204171852 MB											
Diesel Range Organics				U	2170	UG/KG					12/04/18 19:59
**o-Terphenyl	666				565	UG/KG		85	(50%-150%)		
QC1204171854 464714016 MS											
Diesel Range Organics	68900	UX	2240	X	68800	UG/KG		100	(70%-130%)		12/04/18 22:35
**o-Terphenyl	689		621		595	UG/KG		86	(50%-150%)		
QC1204171855 464714016 MSD											
Diesel Range Organics	68900	UX	2240	X	71000	UG/KG	3	103	(0%-20%)		12/04/18 23:14
**o-Terphenyl	689		621		629	UG/KG		91	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL464714

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC	
1204171852	MB for batch 1827952	85	
1204171853	LCS for batch 1827952	90	
464714015	B3MMT6	75	
464714016	B3MMT7	90	
1204171854	B3MMT7MS	86	
1204171855	B3MMT7MSD	91	
464714017	B3MMV0	80	
464714018	B3MMV1	71	
464714019	B3MMV5	85	
464714021	B3MMV7	89	
464714022	B3MMV9	81	
464714023	B3MMW2	90	
464714024	B3MMW3	79	
464714025	B3MMW4	94	
464714026	B3MMW5	90	
464714027	B3MMW8	96	
464714028	B3MMX1	96	
464714020	B3MMV6	77	D

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 28, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464714**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics											
Batch 1826088											
QC1204167548 LCS											
Gasoline Range Organics	500				487	UG/KG		97	(70%-130%)	RXY1	11/27/18 12:27
**Bromofluorobenzene	50.0				48.5	UG/KG		97	(50%-150%)		
QC1204167546 MB											
Gasoline Range Organics				U	16.7	UG/KG					11/27/18 13:23
**Bromofluorobenzene	50.0				43.1	UG/KG		86	(50%-150%)		
QC1204167551 464714026 PS											
Gasoline Range Organics	500	TU	0.00		409	ug/L		82	(70%-130%)		11/28/18 02:19
**Bromofluorobenzene	50.0		37.4		31.4	ug/L		63	(50%-150%)		
QC1204167553 464714026 PSD											
Gasoline Range Organics	500	TU	0.00	T	331	ug/L	21*	66*	(0%-20%)		11/28/18 02:47
**Bromofluorobenzene	50.0		37.4		35.5	ug/L		71	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464714

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204167548	LCS for batch 1826085	97
1204167546	MB for batch 1826085	86
464714015	B3MMT6	82
464714016	B3MMT7	86
464714017	B3MMV0	101
464714018	B3MMV1	88
464714019	B3MMV5	88
464714020	B3MMV6	65
464714021	B3MMV7	70
464714022	B3MMV9	88
464714023	B3MMW2	91
464714024	B3MMW3	74
464714025	B3MMW4	78
464714026	B3MMW5	75
464714027	B3MMW8	72
464714028	B3MMX1	83
1204167551	B3MMW5PS	63
1204167553	B3MMW5PSD	71

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL31889-1 and SL31915-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31889-1 and SL31915-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1M6	11/14/18	Soil	C	8081B
B3L1M0	11/14/18	Soil	C	8081B
B3L1R3	11/14/18	Soil	C	8081B
B3L1K5	11/14/18	Soil	C	8081B
B3L1P4	11/14/18	Soil	C	8081B
B3L1K8	11/14/18	Soil	C	8081B
B3L1K2	11/14/18	Soil	C	8081B
B3L1J0	11/14/18	Soil	C	8081B
B3L1M9	11/14/18	Soil	C	8081B
B3L1R6	11/14/18	Soil	C	8081B
B3L1J3	11/14/18	Soil	C	8081B
B3L1L1	11/15/18	Soil	C	8081B
B3L1J6	11/15/18	Soil	C	8081B
B3L1N8	11/15/18	Soil	C	8081B
B3L1L4	11/15/18	Soil	C	8081B
B3L1H4	11/15/18	Soil	C	8081B
B3L1H7	11/15/18	Soil	C	8081B
B3L1L7	11/15/18	Soil	C	8081B
B3L1R0	11/15/18	Soil	C	8081B
B3L1P1	11/15/18	Soil	C	8081B
B3L1N2	11/15/18	Soil	C	8081B
B3L1N5	11/15/18	Soil	C	8081B
B3L1M3	11/15/18	Soil	C	8081B
B3L1J9	11/15/18	Soil	C	8081B
B3L1R9	11/15/18	Soil	C	8081B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG SL31915-1, sample B3L1R0 was re-extracted beyond but within 2X the holding time. All associated sample results should be qualified estimated and flagged "UJ" for non-detects and flagged "J" for detects.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits are

70% to 130% and the limits for the matrix spike control samples are ones established by the analytical laboratory as specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31889-1, the MSD recovery for beta-BHC was above the upper acceptance limits. All associated sample results were non-detects and should not be qualified.

For SDG SL31915-1, the MS and MSD recoveries for beta-BHC (associated with batch 404777) were above the upper acceptance limits. All associated sample result were non-detects and should not be qualified.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL31915, the LCS recoveries for endosulfan I associated with all samples and for endosulfan II associated with batch 404777 were < the lower acceptance limit. All associated sample results were non-detects and based on professional judgment data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

It should be mentioned that LCS analyses were not performed for multi-component analytes toxaphene and chlordane (technical). No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,-DDD, 4,4-DDE, 4,4-DDT and dieldrin were met.

- **Completeness**

SDGs SL31889-1 and SL31915-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification were due to holding time infraction and low LCS recoveries. See the table in Appendix 2 for a listing of all affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticide & Herbicide Data Qualification Summary			
SDGs: SL31889-1, SL31915-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
4,4′-DDD, Aldrin, alpha-BHC, beta-BHC delta-BHC, Endosulfan sulfate, Endrin, Endrin aldehyde, Endrin ketone, gamma-BHC (Lindane), Heptachlor Methoxychlor Toxaphene	UJ	B3L1R0	Extracted beyond but within 2X the holding time
4,4′-DDE, 4,4′-DDT, alpha-Chlordane, Dieldrin, Endosulfan II, Heptachlor epoxide, trans-Chlordane	J	B3L1R0	Extracted beyond but within 2X the holding time.
Endosulfan I	UJ	B3L1R0	Extracted beyond but within 2X the holding time and low LCS recovery.
Endosulfan I Endosulfan II	UJ	B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9	Low LCS recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/03/19	
			SDG: SL31889-1, SL31915-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31889-1: B3L1M6, B3L1M0, B3L1R3, B3L1K5, B3L1P4, B3L1K8, B3L1K2, B3L1J0, B3L1M9, B3L1R6, B3L1J3					
SDG SL31915-1: B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1R0, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No (N/A)
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG SL31889-1: MSD beta-BHC 113%

SDG SL31915: LCS (batch 404777) endosulfan I 56%; endosulfan II 59%, (batch 407334) endosulfan I 68%
MS/MSD (batch 404777) beta-BHC 119%/110%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SDG SL31915: sample B3L1R0 was extracted beyond but within 2X holding time

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were provided for 4,-DDD, 4,4-DDE, 4,4-DDT and dieldrin.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31884-F-10-C MSD
Matrix: Solid
Analysis Batch: 403813

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 401921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexachlorocyclopentadiene - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	21 - 144	NC	30
Hexachloroethane - DL	360	U D	3520	2270	J D	ug/Kg	☼	64	44 - 102	6	30
Indeno[1,2,3-cd]pyrene - DL	660	U D	3520	3130	J D	ug/Kg	☼	89	30 - 136	5	30
Isophorone - DL	390	U D	3520	2500	J D	ug/Kg	☼	71	48 - 100	16	30
Naphthalene - DL	370	U D	3520	2700	J D	ug/Kg	☼	77	54 - 98	8	30
Nitrobenzene - DL	420	U D	3520	2740	J D	ug/Kg	☼	78	51 - 106	11	30
N-Nitrosodi-n-propylamine - DL	430	U D	3520	2560	J D	ug/Kg	☼	73	47 - 104	4	30
Pentachlorophenol - DL	3500	U D T	3520	3500	U D T	ug/Kg	☼	0	23 - 116	NC	30
Phenanthrene - DL	450	U D	3520	2890	J D	ug/Kg	☼	82	53 - 106	7	30
Phenol - DL	400	U D	3520	2590	J D	ug/Kg	☼	73	41 - 100	8	30
Pyrene - DL	770	U D	3520	3140	J D	ug/Kg	☼	89	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*57*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*77*		*59 - 110*
2-Fluorophenol (Surr) - DL	*76*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*75*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*87*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-401823/1-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/20/18 10:04	11/30/18 17:38	1
Toxaphene	23	U	67	23	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-401823/1-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/20/18 10:04	11/30/18 17:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*104*		*72 - 115*	*11/20/18 10:04*	*11/30/18 17:38*	*1*
Tetrachloro-m-xylene	*92*		*71 - 111*	*11/20/18 10:04*	*11/30/18 17:38*	*1*

Lab Sample ID: LCS 160-401823/2-A
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	18.1		ug/Kg		108	72 - 117
4,4'-DDE	16.7	17.4		ug/Kg		104	75 - 104
4,4'-DDT	16.7	18.5		ug/Kg		111	72 - 119
Aldrin	16.7	16.2		ug/Kg		97	70 - 102
alpha-BHC	16.7	15.9		ug/Kg		96	72 - 111
alpha-Chlordane	16.7	16.8		ug/Kg		101	72 - 105
beta-BHC	16.7	20.6	o	ug/Kg		124	68 - 102
delta-BHC	16.7	17.4		ug/Kg		104	72 - 117
Dieldrin	16.7	17.4		ug/Kg		104	72 - 108
Endosulfan I	16.7	12.9		ug/Kg		77	34 - 96
Endosulfan II	16.7	13.6		ug/Kg		82	46 - 96
Endosulfan sulfate	16.7	17.1		ug/Kg		103	68 - 108
Endrin	16.7	17.1		ug/Kg		103	76 - 116
Endrin aldehyde	16.7	16.1		ug/Kg		97	54 - 97
Endrin ketone	16.7	17.6		ug/Kg		105	71 - 113
gamma-BHC (Lindane)	16.7	15.9		ug/Kg		95	71 - 107
Heptachlor	16.7	15.2		ug/Kg		91	55 - 128
Heptachlor epoxide	16.7	16.5		ug/Kg		99	72 - 107
Methoxychlor	16.7	18.7		ug/Kg		112	71 - 124
trans-Chlordane	16.7	16.9		ug/Kg		101	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*109*		*72 - 115*
Tetrachloro-m-xylene	*97*		*71 - 111*

Lab Sample ID: 160-31884-A-7-B MS
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.3	15.4		ug/Kg	☼	89	60 - 121
4,4'-DDE	2.2		17.3	18.4		ug/Kg	☼	93	63 - 111
4,4'-DDT	0.87	J	17.3	17.0		ug/Kg	☼	93	59 - 122
Aldrin	0.59	U	17.3	14.9		ug/Kg	☼	86	57 - 110
alpha-BHC	0.40	U	17.3	15.1		ug/Kg	☼	87	62 - 117
alpha-Chlordane	3.9	P	17.3	19.5		ug/Kg	☼	90	58 - 114
beta-BHC	0.48	U o N	17.3	18.6		ug/Kg	☼	108	61 - 108

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31884-A-7-B MS
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
delta-BHC	0.35	U	17.3	16.0		ug/Kg	☼	93	64 - 121
Dieldrin	0.22	U	17.3	16.0		ug/Kg	☼	92	57 - 114
Endosulfan I	0.59	U	17.3	12.3		ug/Kg	☼	71	31 - 89
Endosulfan II	0.30	U	17.3	11.6		ug/Kg	☼	67	40 - 93
Endosulfan sulfate	0.35	U	17.3	14.7		ug/Kg	☼	85	56 - 112
Endrin	0.34	U	17.3	15.3		ug/Kg	☼	88	64 - 125
Endrin aldehyde	0.40	U	17.3	14.3		ug/Kg	☼	82	45 - 101
Endrin ketone	0.43	U	17.3	15.2		ug/Kg	☼	88	59 - 115
gamma-BHC (Lindane)	0.50	U	17.3	14.8		ug/Kg	☼	85	61 - 113
Heptachlor	0.29	U	17.3	13.9		ug/Kg	☼	80	33 - 150
Heptachlor epoxide	0.49	U	17.3	17.3		ug/Kg	☼	100	60 - 114
Methoxychlor	0.86	U	17.3	15.9		ug/Kg	☼	92	58 - 130
trans-Chlordane	4.1		17.3	18.7		ug/Kg	☼	85	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*94*		*72 - 115*
Tetrachloro-m-xylene	*85*		*71 - 111*

Lab Sample ID: 160-31884-A-7-C MSD
Matrix: Solid
Analysis Batch: 403642

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 401823

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.3	15.4		ug/Kg	☼	89	60 - 121	0	30
4,4'-DDE	2.2		17.3	17.9		ug/Kg	☼	90	63 - 111	3	30
4,4'-DDT	0.87	J	17.3	17.2		ug/Kg	☼	95	59 - 122	1	30
Aldrin	0.59	U	17.3	15.3		ug/Kg	☼	89	57 - 110	3	30
alpha-BHC	0.40	U	17.3	15.7		ug/Kg	☼	91	62 - 117	4	30
alpha-Chlordane	3.9	P	17.3	19.9		ug/Kg	☼	92	58 - 114	2	30
beta-BHC	0.48	U o N	17.3	19.5	N	ug/Kg	☼	113	61 - 108	4	30
delta-BHC	0.35	U	17.3	16.4		ug/Kg	☼	95	64 - 121	2	30
Dieldrin	0.22	U	17.3	16.2		ug/Kg	☼	94	57 - 114	1	30
Endosulfan I	0.59	U	17.3	12.7		ug/Kg	☼	74	31 - 89	3	30
Endosulfan II	0.30	U	17.3	11.7		ug/Kg	☼	68	40 - 93	1	30
Endosulfan sulfate	0.35	U	17.3	14.9		ug/Kg	☼	86	56 - 112	2	30
Endrin	0.34	U	17.3	15.5		ug/Kg	☼	90	64 - 125	1	30
Endrin aldehyde	0.40	U	17.3	14.5		ug/Kg	☼	84	45 - 101	2	30
Endrin ketone	0.43	U	17.3	15.4		ug/Kg	☼	89	59 - 115	1	30
gamma-BHC (Lindane)	0.50	U	17.3	15.3		ug/Kg	☼	88	61 - 113	3	30
Heptachlor	0.29	U	17.3	14.5	P	ug/Kg	☼	84	33 - 150	4	30
Heptachlor epoxide	0.49	U	17.3	18.0		ug/Kg	☼	104	60 - 114	4	30
Methoxychlor	0.86	U	17.3	16.4		ug/Kg	☼	95	58 - 130	3	30
trans-Chlordane	4.1		17.3	19.0		ug/Kg	☼	86	62 - 114	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31889-7 - DL	B3L1K6	62	78	71	64	77	86
160-31889-8 - DL	B3L1J4	62	84	82	63	84	95
160-31889-9 - DL	B3L1M1	57	80	77	66	77	85
160-31889-10 - DL	B3L1M7	67	74	80	71	79	91
160-31889-11	B3L1J1	70	86	83	70	82	85
160-31889-12	B3L1K9	77	82	81	71	80	86
160-31889-18	B3L1P5	71	83	85	71	83	88
160-31889-19 - DL	B3L1N0	70	79	82	68	83	92
160-31889-20 - DL	B3L1R4	68	80	76	67	76	91
160-31889-21 - DL	B3L1K3	65	86	82	70	80	87
160-31889-22	B3L1R7	72	83	78	69	78	96

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31884-F-10-B MS - DL	Matrix Spike	64	72	70	65	70	85
160-31884-F-10-C MSD - DL	Matrix Spike Duplicate	57	77	76	73	75	87
LCS 160-401921/2-A	Lab Control Sample	80	77	76	75	78	82
MB 160-401921/1-A	Method Blank	69	80	76	67	75	82

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31889-1	B3L1M6	92	86
160-31889-2	B3L1M0	100	92
160-31889-3	B3L1R3	90	89
160-31889-4	B3L1K5	93	87

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31889-5	B3L1P4	101	91
160-31889-6	B3L1K8	99	88
160-31889-13	B3L1K2	101	88
160-31889-14	B3L1J0	95	84
160-31889-15	B3L1M9	92	86
160-31889-16	B3L1R6	97	88
160-31889-17	B3L1J3	98	92

Percent Surrogate Recovery (Acceptance Limits)

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31884-A-7-B MS	Matrix Spike	94	85
160-31884-A-7-C MSD	Matrix Spike Duplicate	90	89
LCS 160-401823/2-A	Lab Control Sample	109	97
MB 160-401823/1-A	Method Blank	104	92

Percent Surrogate Recovery (Acceptance Limits)

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	DCB1 (23-146)
160-31889-1	B3L1M6	79
160-31889-2	B3L1M0	84
160-31889-3	B3L1R3	85
160-31889-4	B3L1K5	68
160-31889-5	B3L1P4	81
160-31889-6	B3L1K8	81
160-31889-13	B3L1K2	80
160-31889-15	B3L1M9	83
160-31889-16	B3L1R6	79
160-31889-17	B3L1J3	81

Percent Surrogate Recovery (Acceptance Limits)

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-1 MSD
Matrix: Soil
Analysis Batch: 403968

Client Sample ID: B3L1P2
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3400	D	ug/Kg	☼	100	33 - 140	5	30
Fluoranthene - DL	260	U D	3420	3070	D	ug/Kg	☼	90	45 - 109	6	30
Fluorene - DL	230	U D	3420	3060	D	ug/Kg	☼	90	45 - 109	11	30
Hexachlorobenzene - DL	220	U D	3420	2890	D	ug/Kg	☼	85	48 - 113	9	30
Hexachlorobutadiene - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 109	3	30
Hexachlorocyclopentadiene - DL	1700	U D	3420	2080	J D	ug/Kg	☼	61	21 - 144	5	30
Hexachloroethane - DL	180	U D	3420	2330	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3580	D	ug/Kg	☼	105	30 - 136	6	30
Isophorone - DL	190	U D	3420	2450	D	ug/Kg	☼	72	48 - 100	1	30
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98	0	30
Nitrobenzene - DL	210	U D	3420	2570	D	ug/Kg	☼	75	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2700	D	ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol - DL	1700	U D	3420	2320	J D	ug/Kg	☼	68	23 - 116	8	30
Phenanthrene - DL	220	U D	3420	2950	D	ug/Kg	☼	86	53 - 106	6	30
Phenol - DL	190	U D	3420	2720	D	ug/Kg	☼	80	41 - 100	1	30
Pyrene - DL	370	U D	3420	2930	D	ug/Kg	☼	86	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*82*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*73*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*78*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-402188/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Toxaphene	23	U	67	23	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*105*		*72 - 115*	*11/21/18 13:23*	*12/09/18 13:29*	*1*
Tetrachloro-m-xylene	*95*		*71 - 111*	*11/21/18 13:23*	*12/09/18 13:29*	*1*

Lab Sample ID: LCS 160-402188/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	17.6		ug/Kg		106	72 - 117
4,4'-DDE	16.7	17.6	o	ug/Kg		105	75 - 104
4,4'-DDT	16.7	18.1		ug/Kg		109	72 - 119
Aldrin	16.7	16.2		ug/Kg		97	70 - 102
alpha-BHC	16.7	16.1		ug/Kg		97	72 - 111
alpha-Chlordane	16.7	16.5		ug/Kg		99	72 - 105
beta-BHC	16.7	20.6	o	ug/Kg		123	68 - 102
delta-BHC	16.7	16.3		ug/Kg		98	72 - 117
Dieldrin	16.7	17.1		ug/Kg		103	72 - 108
Endosulfan I	16.7	9.27		ug/Kg		56	34 - 96
Endosulfan II	16.7	9.84		ug/Kg		59	46 - 96
Endosulfan sulfate	16.7	17.0		ug/Kg		102	68 - 108
Endrin	16.7	16.8		ug/Kg		101	76 - 116
Endrin aldehyde	16.7	16.1		ug/Kg		96	54 - 97
Endrin ketone	16.7	17.2		ug/Kg		103	71 - 113
gamma-BHC (Lindane)	16.7	16.1		ug/Kg		96	71 - 107
Heptachlor	16.7	15.2		ug/Kg		91	55 - 128
Heptachlor epoxide	16.7	16.5		ug/Kg		99	72 - 107
Methoxychlor	16.7	18.0		ug/Kg		108	71 - 124
trans-Chlordane	16.7	16.8		ug/Kg		101	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*104*		*72 - 115*
Tetrachloro-m-xylene	*99*		*71 - 111*

Lab Sample ID: 160-31887-C-5-B MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 402188**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.6	15.9		ug/Kg	☼	90	60 - 121

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-C-5-B MS
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDE	2.3	o	17.6	19.6		ug/Kg	☼	98	63 - 111
4,4'-DDT	1.2	J	17.6	18.0		ug/Kg	☼	96	59 - 122
Aldrin	0.60	U	17.6	16.6		ug/Kg	☼	94	57 - 110
alpha-BHC	0.41	U	17.6	16.6		ug/Kg	☼	94	62 - 117
alpha-Chlordane	0.98	U	17.6	17.2		ug/Kg	☼	98	58 - 114
beta-BHC	0.48	U o N	17.6	20.9	N	ug/Kg	☼	119	61 - 108
delta-BHC	0.36	U	17.6	16.1		ug/Kg	☼	92	64 - 121
Dieldrin	0.22	U	17.6	17.0		ug/Kg	☼	97	57 - 114
Endosulfan I	0.60	U	17.6	9.01		ug/Kg	☼	51	31 - 89
Endosulfan II	0.30	U	17.6	9.44		ug/Kg	☼	54	40 - 93
Endosulfan sulfate	0.35	U	17.6	15.6		ug/Kg	☼	89	56 - 112
Endrin	0.35	U	17.6	16.5		ug/Kg	☼	94	64 - 125
Endrin aldehyde	0.41	U	17.6	15.0		ug/Kg	☼	85	45 - 101
Endrin ketone	0.44	U	17.6	16.1		ug/Kg	☼	92	59 - 115
gamma-BHC (Lindane)	0.50	U	17.6	16.4		ug/Kg	☼	93	61 - 113
Heptachlor	0.30	U	17.6	15.8		ug/Kg	☼	90	33 - 150
Heptachlor epoxide	0.50	U	17.6	16.7		ug/Kg	☼	95	60 - 114
Methoxychlor	0.86	U	17.6	16.9		ug/Kg	☼	96	58 - 130
trans-Chlordane	0.90	J	17.6	17.4		ug/Kg	☼	94	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*97*		*72 - 115*
Tetrachloro-m-xylene	*95*		*71 - 111*

Lab Sample ID: 160-31887-C-5-C MSD
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.4	14.3		ug/Kg	☼	82	60 - 121	10	30
4,4'-DDE	2.3	o	17.4	17.3		ug/Kg	☼	86	63 - 111	12	30
4,4'-DDT	1.2	J	17.4	17.0		ug/Kg	☼	91	59 - 122	6	30
Aldrin	0.60	U	17.4	14.8		ug/Kg	☼	85	57 - 110	11	30
alpha-BHC	0.41	U	17.4	15.2		ug/Kg	☼	88	62 - 117	9	30
alpha-Chlordane	0.98	U	17.4	15.6		ug/Kg	☼	90	58 - 114	10	30
beta-BHC	0.48	U o N	17.4	19.1	N	ug/Kg	☼	110	61 - 108	9	30
delta-BHC	0.36	U	17.4	14.9		ug/Kg	☼	86	64 - 121	8	30
Dieldrin	0.22	U	17.4	15.0		ug/Kg	☼	86	57 - 114	12	30
Endosulfan I	0.60	U	17.4	8.05		ug/Kg	☼	46	31 - 89	11	30
Endosulfan II	0.30	U	17.4	8.52		ug/Kg	☼	49	40 - 93	10	30
Endosulfan sulfate	0.35	U	17.4	13.9		ug/Kg	☼	80	56 - 112	11	30
Endrin	0.35	U	17.4	14.5		ug/Kg	☼	84	64 - 125	12	30
Endrin aldehyde	0.41	U	17.4	13.5		ug/Kg	☼	78	45 - 101	11	30
Endrin ketone	0.44	U	17.4	14.2		ug/Kg	☼	82	59 - 115	13	30
gamma-BHC (Lindane)	0.50	U	17.4	15.0		ug/Kg	☼	86	61 - 113	9	30
Heptachlor	0.30	U	17.4	14.1		ug/Kg	☼	81	33 - 150	12	30
Heptachlor epoxide	0.50	U	17.4	15.0		ug/Kg	☼	86	60 - 114	11	30
Methoxychlor	0.86	U	17.4	14.9		ug/Kg	☼	86	58 - 130	13	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-C-5-C MSD
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-Chlordane	0.90	J	17.4	15.6		ug/Kg	☼	85	62 - 114	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Lab Sample ID: MB 160-405534/1-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405534

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Toxaphene	23	U	67	23	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*	*12/13/18 15:03*	*12/23/18 15:49*	*1*
Tetrachloro-m-xylene	*90*		*71 - 111*	*12/13/18 15:03*	*12/23/18 15:49*	*1*

Lab Sample ID: LCS 160-405534/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.3		ug/Kg		86	72 - 117
4,4'-DDE	16.7	14.9		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.4		ug/Kg		92	72 - 119
Aldrin	16.7	13.9		ug/Kg		83	70 - 102
alpha-BHC	16.7	14.4		ug/Kg		86	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-405534/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
beta-BHC	16.7	13.4		ug/Kg		81	68 - 102
delta-BHC	16.7	14.9		ug/Kg		89	72 - 117
Dieldrin	16.7	14.6		ug/Kg		87	72 - 108
Endosulfan I	16.7	11.4		ug/Kg		68	34 - 96
Endosulfan II	16.7	12.2		ug/Kg		73	46 - 96
Endosulfan sulfate	16.7	13.6		ug/Kg		81	68 - 108
Endrin	16.7	13.8		ug/Kg		83	76 - 116
Endrin aldehyde	16.7	13.6		ug/Kg		81	54 - 97
Endrin ketone	16.7	14.3		ug/Kg		86	71 - 113
gamma-BHC (Lindane)	16.7	13.9		ug/Kg		83	71 - 107
Heptachlor	16.7	13.4		ug/Kg		81	55 - 128
Heptachlor epoxide	16.7	14.1		ug/Kg		84	72 - 107
Methoxychlor	16.7	14.4		ug/Kg		86	71 - 124
trans-Chlordane	16.7	14.5		ug/Kg		87	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*96*		*72 - 115*
Tetrachloro-m-xylene	*84*		*71 - 111*

Lab Sample ID: 160-31915-18 MS
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L1R0
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U Z	17.6	13.5		ug/Kg	☼	76	60 - 121
4,4'-DDE	2.6	Z	17.6	16.9		ug/Kg	☼	81	63 - 111
4,4'-DDT	1.4	J Z	17.6	15.4		ug/Kg	☼	80	59 - 122
Aldrin	0.60	U Z	17.6	13.8		ug/Kg	☼	78	57 - 110
alpha-BHC	0.41	U Z	17.6	14.5		ug/Kg	☼	82	62 - 117
alpha-Chlordane	1.3	J Z	17.6	14.9		ug/Kg	☼	77	58 - 114
beta-BHC	0.48	U Z	17.6	13.3		ug/Kg	☼	76	61 - 108
delta-BHC	0.36	U Z	17.6	14.8		ug/Kg	☼	84	64 - 121
Dieldrin	0.71	J Z	17.6	14.4		ug/Kg	☼	78	57 - 114
Endosulfan I	0.60	U Z	17.6	11.2		ug/Kg	☼	64	31 - 89
Endosulfan II	0.43	J Z	17.6	11.8		ug/Kg	☼	65	40 - 93
Endosulfan sulfate	0.36	U Z	17.6	12.9		ug/Kg	☼	73	56 - 112
Endrin	0.35	U Z	17.6	13.5		ug/Kg	☼	77	64 - 125
Endrin aldehyde	0.41	U Z	17.6	12.9		ug/Kg	☼	73	45 - 101
Endrin ketone	0.44	U Z	17.6	13.6		ug/Kg	☼	77	59 - 115
gamma-BHC (Lindane)	0.50	U Z	17.6	13.8		ug/Kg	☼	78	61 - 113
Heptachlor	0.30	U Z	17.6	13.3		ug/Kg	☼	75	33 - 150
Heptachlor epoxide	0.62	J Z	17.6	14.1		ug/Kg	☼	76	60 - 114
Methoxychlor	0.87	U Z	17.6	13.4		ug/Kg	☼	76	58 - 130
trans-Chlordane	1.2	J Z	17.6	15.0		ug/Kg	☼	78	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31915-18 MS
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L1R0
Prep Type: Total/NA
Prep Batch: 405534

Surrogate	MS %Recovery	MS Qualifier	Limits
Tetrachloro-m-xylene	*82*		*71 - 111*

Lab Sample ID: 160-31915-18 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L1R0
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U Z	17.6	13.1		ug/Kg	☼	74	60 - 121	3	30
4,4'-DDE	2.6	Z	17.6	16.6		ug/Kg	☼	80	63 - 111	1	30
4,4'-DDT	1.4	J Z	17.6	15.2		ug/Kg	☼	78	59 - 122	2	30
Aldrin	0.60	U Z	17.6	13.2		ug/Kg	☼	75	57 - 110	4	30
alpha-BHC	0.41	U Z	17.6	13.6		ug/Kg	☼	77	62 - 117	6	30
alpha-Chlordane	1.3	J Z	17.6	14.1		ug/Kg	☼	73	58 - 114	5	30
beta-BHC	0.48	U Z	17.6	13.3		ug/Kg	☼	76	61 - 108	0	30
delta-BHC	0.36	U Z	17.6	14.7		ug/Kg	☼	84	64 - 121	1	30
Dieldrin	0.71	J Z	17.6	13.9		ug/Kg	☼	75	57 - 114	4	30
Endosulfan I	0.60	U Z	17.6	10.8		ug/Kg	☼	61	31 - 89	4	30
Endosulfan II	0.43	J Z	17.6	11.4		ug/Kg	☼	63	40 - 93	3	30
Endosulfan sulfate	0.36	U Z	17.6	12.7		ug/Kg	☼	72	56 - 112	2	30
Endrin	0.35	U Z	17.6	13.1		ug/Kg	☼	74	64 - 125	3	30
Endrin aldehyde	0.41	U Z	17.6	12.6		ug/Kg	☼	72	45 - 101	2	30
Endrin ketone	0.44	U Z	17.6	13.3		ug/Kg	☼	75	59 - 115	2	30
gamma-BHC (Lindane)	0.50	U Z	17.6	13.3		ug/Kg	☼	75	61 - 113	4	30
Heptachlor	0.30	U Z	17.6	12.6		ug/Kg	☼	72	33 - 150	5	30
Heptachlor epoxide	0.62	J Z	17.6	13.7		ug/Kg	☼	75	60 - 114	2	30
Methoxychlor	0.87	U Z	17.6	13.0		ug/Kg	☼	74	58 - 130	3	30
trans-Chlordane	1.2	J Z	17.6	14.5		ug/Kg	☼	76	62 - 114	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*78*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31915-16	B3L1H7	112	95
160-31915-17	B3L1L7	108	92
160-31915-18	B3L1R0	80	78
160-31915-18 MS	B3L1R0	84	82
160-31915-18 MSD	B3L1R0	84	78
160-31915-24	B3L1P1	111	94
160-31915-25	B3L1N2	87	97
160-31915-26	B3L1N5	87	83
160-31915-27	B3L1M3	109	99
160-31915-28	B3L1J9	96	94
160-31915-29	B3L1R9	99	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB1 (72-115)	TCX2 (71-111)
160-31915-12	B3L1J6	88	84
160-31915-13	B3L1N8	103	91
160-31915-15	B3L1H4	99	94

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31887-C-5-B MS	Matrix Spike	97	95
160-31887-C-5-C MSD	Matrix Spike Duplicate	92	89
LCS 160-402188/2-A	Lab Control Sample	104	99
LCS 160-405534/2-A	Lab Control Sample	96	84
MB 160-402188/1-A	Method Blank	105	95
MB 160-405534/1-A	Method Blank	92	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Group (SDGs) SL31889-1 and SL31915-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31889-1 and SL31915-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1M6	11/14/18	Soil	C	8082A
B3L1M0	11/14/18	Soil	C	8082A
B3L1R3	11/14/18	Soil	C	8082A
B3L1K5	11/14/18	Soil	C	8082A
B3L1P4	11/14/18	Soil	C	8082A
B3L1K8	11/14/18	Soil	C	8082A
B3L1K2	11/14/18	Soil	C	8082A
B3L1J0	11/14/18	Soil	C	8082A
B3L1M9	11/14/18	Soil	C	8082A
B3L1R6	11/14/18	Soil	C	8082A
B3L1J3	11/14/18	Soil	C	8082A
B3L1L1	11/15/18	Soil	C	8082A
B3L1J6	11/15/18	Soil	C	8082A
B3L1N8	11/15/18	Soil	C	8082A
B3L1L4	11/15/18	Soil	C	8082A
B3L1H4	11/15/18	Soil	C	8082A
B3L1H7	11/15/18	Soil	C	8082A
B3L1L7	11/15/18	Soil	C	8082A
B3L1R0	11/15/18	Soil	C	8082A
B3L1P1	11/15/18	Soil	C	8082A
B3L1N2	11/15/18	Soil	C	8082A
B3L1N5	11/15/18	Soil	C	8082A
B3L1M3	11/15/18	Soil	C	8082A
B3L1J9	11/15/18	Soil	C	8082A
B3L1R9	11/15/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within 1 one year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and the matrix spike accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses.

Laboratory Control Samples (LCSs)

The LCS recovery was acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All required CRDLs for PCBs were met.

- **Completeness**

SDGs SL31889-1 and SL31915-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDG: SL31889-1, SL31915-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/03/19	
			SDG: SL31889-1, SL31915-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31889-1: B3L1M6, B3L1M0, B3L1R3, B3L1K5, B3L1P4, B3L1K8, B3L1K2, B3L1J0, B3L1M9, B3L1R6, B3L1J3					
SDG SL31915-1: B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1R0, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No (N/A)
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes) No N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No (N/A)
Positive results resolved acceptably?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were provided for arcolor 1016, aroclor 1254 and aroclor 1260.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-401897/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1248	11	U	33	11	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1254	13	U	33	13	ug/Kg		11/20/18 13:55	11/26/18 18:13	1
Aroclor 1260	10	U	33	10	ug/Kg		11/20/18 13:55	11/26/18 18:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*96*		*23 - 146*	*11/20/18 13:55*	*11/26/18 18:13*	*1*

Lab Sample ID: LCS 160-401897/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	140		ug/Kg		84	52 - 134
Aroclor 1260	167	156		ug/Kg		94	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*23 - 146*

Lab Sample ID: 160-31884-A-7-E MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	173	138		ug/Kg	☼	80	23 - 140
Aroclor 1260	10	U	173	169		ug/Kg	☼	98	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*95*		*23 - 146*

Lab Sample ID: 160-31884-A-7-F MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402705 — **Prep Batch: 401897**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	171	139		ug/Kg	☼	81	23 - 140	1	30
Aroclor 1260	10	U	171	145		ug/Kg	☼	85	20 - 131	15	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: MB 160-402934/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402934**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1248	11	U	33	11	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1254	13	U	33	13	ug/Kg		11/27/18 16:08	12/03/18 16:26	1
Aroclor 1260	10	U	33	10	ug/Kg		11/27/18 16:08	12/03/18 16:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*88*		*23 - 146*	*11/27/18 16:08*	*12/03/18 16:26*	*1*

Lab Sample ID: LCS 160-402934/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402934**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	140		ug/Kg		84	52 - 134
Aroclor 1260	167	147		ug/Kg		88	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*86*		*23 - 146*

Lab Sample ID: 160-31889-14 MS — **Client Sample ID: B3L1J0**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	174	143		ug/Kg	☼	82	23 - 140
Aroclor 1260	10	U	174	155		ug/Kg	☼	89	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*

Lab Sample ID: 160-31889-14 MSD — **Client Sample ID: B3L1J0**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402934**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	173	137		ug/Kg	☼	79	23 - 140	5	30
Aroclor 1260	10	U	173	148		ug/Kg	☼	86	20 - 131	4	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*88*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31889-5	B3L1P4	101	91
160-31889-6	B3L1K8	99	88
160-31889-13	B3L1K2	101	88
160-31889-14	B3L1J0	95	84
160-31889-15	B3L1M9	92	86
160-31889-16	B3L1R6	97	88
160-31889-17	B3L1J3	98	92

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31884-A-7-B MS	Matrix Spike	94	85
160-31884-A-7-C MSD	Matrix Spike Duplicate	90	89
LCS 160-401823/2-A	Lab Control Sample	109	97
MB 160-401823/1-A	Method Blank	104	92

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-31889-1	B3L1M6	79
160-31889-2	B3L1M0	84
160-31889-3	B3L1R3	85
160-31889-4	B3L1K5	68
160-31889-5	B3L1P4	81
160-31889-6	B3L1K8	81
160-31889-13	B3L1K2	80
160-31889-15	B3L1M9	83
160-31889-16	B3L1R6	79
160-31889-17	B3L1J3	81

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**							
160-31889-14	B3L1J0	84							
160-31889-14 MS	B3L1J0	89							
160-31889-14 MSD	B3L1J0	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
160-31884-A-7-E MS	Matrix Spike	95							
160-31884-A-7-F MSD	Matrix Spike Duplicate	85							
LCS 160-401897/2-A	Lab Control Sample	91							
MB 160-401897/1-A	Method Blank	96							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**							
LCS 160-402934/2-A	Lab Control Sample	86							
MB 160-402934/1-A	Method Blank	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31915-18 MS
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L1R0
Prep Type: Total/NA
Prep Batch: 405534

Surrogate	MS %Recovery	MS Qualifier	Limits
Tetrachloro-m-xylene	82		71 - 111

Lab Sample ID: 160-31915-18 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L1R0
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U Z	17.6	13.1		ug/Kg	☼	74	60 - 121	3	30
4,4'-DDE	2.6	Z	17.6	16.6		ug/Kg	☼	80	63 - 111	1	30
4,4'-DDT	1.4	J Z	17.6	15.2		ug/Kg	☼	78	59 - 122	2	30
Aldrin	0.60	U Z	17.6	13.2		ug/Kg	☼	75	57 - 110	4	30
alpha-BHC	0.41	U Z	17.6	13.6		ug/Kg	☼	77	62 - 117	6	30
alpha-Chlordane	1.3	J Z	17.6	14.1		ug/Kg	☼	73	58 - 114	5	30
beta-BHC	0.48	U Z	17.6	13.3		ug/Kg	☼	76	61 - 108	0	30
delta-BHC	0.36	U Z	17.6	14.7		ug/Kg	☼	84	64 - 121	1	30
Dieldrin	0.71	J Z	17.6	13.9		ug/Kg	☼	75	57 - 114	4	30
Endosulfan I	0.60	U Z	17.6	10.8		ug/Kg	☼	61	31 - 89	4	30
Endosulfan II	0.43	J Z	17.6	11.4		ug/Kg	☼	63	40 - 93	3	30
Endosulfan sulfate	0.36	U Z	17.6	12.7		ug/Kg	☼	72	56 - 112	2	30
Endrin	0.35	U Z	17.6	13.1		ug/Kg	☼	74	64 - 125	3	30
Endrin aldehyde	0.41	U Z	17.6	12.6		ug/Kg	☼	72	45 - 101	2	30
Endrin ketone	0.44	U Z	17.6	13.3		ug/Kg	☼	75	59 - 115	2	30
gamma-BHC (Lindane)	0.50	U Z	17.6	13.3		ug/Kg	☼	75	61 - 113	4	30
Heptachlor	0.30	U Z	17.6	12.6		ug/Kg	☼	72	33 - 150	5	30
Heptachlor epoxide	0.62	J Z	17.6	13.7		ug/Kg	☼	75	60 - 114	2	30
Methoxychlor	0.87	U Z	17.6	13.0		ug/Kg	☼	74	58 - 130	3	30
trans-Chlordane	1.2	J Z	17.6	14.5		ug/Kg	☼	76	62 - 114	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	84		72 - 115
Tetrachloro-m-xylene	78		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: MB 160-402292/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	94		23 - 146	11/21/18 16:13	12/03/18 18:08	1

Lab Sample ID: LCS 160-402292/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	90		23 - 146

Lab Sample ID: 160-31887-C-6-C MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	82		23 - 146

Lab Sample ID: 160-31887-C-6-D MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-402141/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4	U	9.8	2.4	mg/Kg		11/21/18 12:35	12/04/18 16:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		11/21/18 12:35	12/04/18 16:04	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB2 (23-146)						
160-31915-11	B3L1L1	100						
160-31915-12	B3L1J6	77						
160-31915-13	B3L1N8	118						
160-31915-14	B3L1L4	103						
160-31915-15	B3L1H4	79						
160-31915-16	B3L1H7	88						
160-31915-17	B3L1L7	86						
160-31915-18	B3L1R0	99						
160-31915-24	B3L1P1	113						
160-31915-25	B3L1N2	81						
160-31915-26	B3L1N5	80						
160-31915-27	B3L1M3	74						
160-31915-28	B3L1J9	75						
160-31915-29	B3L1R9	86						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB2 (23-146)						
160-31887-C-6-C MS	Matrix Spike	82						
160-31887-C-6-D MSD	Matrix Spike Duplicate	87						
LCS 160-402292/2-A	Lab Control Sample	90						
MB 160-402292/1-A	Method Blank	94						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL464556 and GEL464714

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL464556 and GEL464714 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L1M8	11/14/18	Soil	C	8151A
B3L1J2	11/14/18	Soil	C	8151A
B3L1R2	11/14/18	Soil	C	8151A
B3L1R5	11/14/18	Soil	C	8151A
B3L1L9	11/14/18	Soil	C	8151A
B3L1P3	11/14/18	Soil	C	8151A
B3L1K4	11/14/18	Soil	C	8151A
B3L1K1	11/14/18	Soil	C	8151A
B3L1M5	11/14/18	Soil	C	8151A
B3L1H9	11/14/18	Soil	C	8151A
B3L1K7	11/14/18	Soil	C	8151A
B3L1H3	11/15/18	Soil	C	8151A
B3L1H6	11/15/18	Soil	C	8151A
B3L1J5	11/15/18	Soil	C	8151A
B3L1J8	11/15/18	Soil	C	8151A
B3L1L0	11/15/18	Soil	C	8151A
B3L1L3	11/15/18	Soil	C	8151A
B3L1L6	11/15/18	Soil	C	8151A
B3L1M2	11/15/18	Soil	C	8151A
B3L1N1	11/15/18	Soil	C	8151A
B3L1N4	11/15/18	Soil	C	8151A
B3L1N7	11/15/18	Soil	C	8151A
B3L1P0	11/15/18	Soil	C	8151A
B3L1P9	11/15/18	Soil	C	8151A
B3L1R8	11/15/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike accuracy limits for herbicides are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL464556, the 2,4-dichlorophenylacetic acid recoveries on both columns for sample B3L1R2 were above the upper acceptance limit. All sample results were non-detects and should not be qualified as a result.

For SDG GEL464714, the 2,4-dichlorophenylacetic acid recoveries for samples B3L1L0, B3L1L6, B3L1M2, B3L1N7, B3L1P0, B3L1H3MS and B3L1H3MSD on the primary column were above the upper acceptance limit and for samples B3L1M2, B3L1N1, B3L1N4, B3L1N7, and B3L1P0 on the second column were < the lower acceptance limit but ≥10%. The results for samples B3L1L0, B3L1L6, B3L1M2, B3L1N1, B3L1N4, B3L1N7 and B3L1P0 were non-detects and results were reported from the primary column. Data should not be qualified as a result. Since samples B3L1H3MS and B3L1H3MSD were QC samples, data should not be qualified as a result. The 2,4-dichlorophenylacetic acid recoveries for samples B3L1N1 and B3L1P9 on the primary column were < the lower acceptance limit but ≥10%. All results for samples B3L1N1 and B3L1P9 were non-detects and should be qualified as estimates and flagged "UJ."

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG GEL464556, the MS and MSD recoveries dinoseb were <20%. All sample results were non-detects and should be qualified as unusable and flagged "UR." The MS and/or MSD recoveries for dalapon, dicamba dichlorprop, MCPA and MCPP were < the lower acceptance limit but ≥20%. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG GEL464714, the MS and MSD recoveries for dinoseb were <20%. All sample results were non-detects and should be qualified as unusable and flagged "UR." The MS and/or MSD recoveries for 2,4,5-T, 2,4,5-TP, dalapon and dicamba were < the lower acceptance limit but >20%. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that an MS/MSD analyses was not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG GEL464556, the LCS recovery for dinoseb was <20%. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of all affected samples.

It should be mentioned that an LCS analysis was not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable with the following exception.

For SDG GEL464556, the RPDs for 2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dalapon, dicamba, dichlorprop, MCPA and MCPP were above the acceptance limit. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL464556 and GEL464714 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 90%.

MAJOR DEFICIENCIES

A major deficiency leading to qualification of the dinoseb results for all samples as unusable were due to very low LCS recovery and/or very low matrix spike recoveries.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of the sample results as estimates were due to low matrix spike recovery, low surrogate recovery, low LCS recovery and poor MS/MSD precision. See the table in Appendix 2 for a listing of all affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticide & Herbicide Data Qualification Summary			
SDGs: GEL 464556, GEL464714	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4-D 2,4-DB Dichlorprop MCPA MCPP	UJ	B3L1N1, B3L1P9	Low surrogate recoveries
2,4,5-T, 2,4,5-TP, Dalapon, Dicamba	UJ	B3L1N1, B3L1P9	Low surrogate recoveries, low matrix spike recoveries
Dinoseb	UR	B3L1N1, B3L1P9	Low surrogate recoveries, very low matrix spike recoveries
Dinoseb	UR	B3L1M8. B3L1J2, B3L1R2, B3L1R5, B3L1L9, B3L1P3, B3L1K4, B3L1K1, B3L1M5, B3L1H9, B3L1K7,	Very low matrix spike recoveries and very low LCS recovery.
Dinoseb	UR	B3L1H3, B3L1H6, B3L1J5, B3L1J8, B3L1L0, B3L1L3, B3L1L6, B3L1M2, B3L1N4, B3L1N7, B3L1P0, B3L1R8	Very low matrix spike recoveries
Dalapon, Dicamba, Diclorprop, MCPA, MCPP	UJ	B3L1M8. B3L1J2, B3L1R2, B3L1R5, B3L1L9, B3L1P3, B3L1K4, B3L1K1, B3L1M5, B3L1H9, B3L1K7	Low matrix spike recoveries and poor MS/MSD precision
2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB	UJ	B3L1M8. B3L1J2, B3L1R2, B3L1R5, B3L1L9, B3L1P3, B3L1K4, B3L1K1, B3L1M5, B3L1H9, B3L1K7	Poor MS/MSD precision
2,4,5-T, 2,4,5-TP,	UJ	B3L1H3, B3L1H6, B3L1J5, B3L1J8,	Low matrix spike recoveries

Dalapon, Dicamba		B3L1L0, B3L1L3, B3L1L6, B3L1M2, B3L1N4, B3L1N7, B3L1P0, B3L1R8	

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-010		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/03/19	
			SDG: GEL464556, GEL464714		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX: Soil					
SDG GEL464556: B3L1M8, B3L1J2, B3L1R2, B3L1R5, B3L1L9, B3L1P3, B3L1K4, B3L1K1, B3L1M5 B3L1H9, B3L1K7					
SDG GEL464714: B3L1H3, B3L1H6, B3L1J5, B3L1J8, B3L1L0, B3L1L3, B3L1L6, B3L1M2, B3L1N1, B3L1N4, B3L1N7, B3L1P0, B3L1P9, B3L1R8					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No (N/A)
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG GEL464556: DCAA 1/DCAA 2: B3L1R2 188%/188%

SDG GEL464714: DCAA 1 B3L1L0 164%; B3L1L6 247%; B3L1M2 331%; B3L1N1 40%; B3L1N7 144%; B3L1P0 146%; B3L1P9 50%; B3L1H3MS 245%; B3L1H3MSD 247%
DCAA2 B3L1M2 50%; B3L1N1 41%; B3L1N4 48%; B3L1N7 55%; B3L1P0 51%

SDG GEL464556: LCS dinoseb 0%; MS dalapon 58%, dichlorprop 69%; dinoseb 0%; MCPA 55%; MCPP 67%
MSD dalapon 47%; dicamba 69%, dichlorprop 63%, dinoseb 0%, MCPA 46%; MCPP 60%

SDG GEL464714: MS 2,4,5-T 64%, 2,4,5-TP 59%; dalapon 43%; dicamba 64%, dinoseb 0%,
MSD 2,4,5-T 64%; 2,4,5-TP 59%, dalapon 43%, dicamba 64%, dinoseb 0%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG GEL464556: RPDs 2,4,5-T 60%; 2,4,5-TP 57%, 2,4-D 75%, 2,4-DB 53%, dalapon 49%, dicamba 57% dichlorprop 60%, MCPA 51%, MCPP 56%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL not provided in SAP

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL464556

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204163196	MB for batch 1824049	111	108
1204163197	LCS for batch 1824049	123	112
464556001	B3L1M8	96	98
1204163198	B3L1M8MS	88	92
1204163199	B3L1M8MSD	75	89
464556002	B3LIJ2	94	91
464556003	B3L1R2	188 *	188 *
464556004	B3L1R5	99	94
464556005	B3L1L9	90	103
464556006	B3L1P3	97	102
464556007	B3L1K4	112	113
464556008	B3L1K1	107	108
464556009	B3L1M5	106	115
464556010	B3L1H9	105	120
464556011	B3L1K7	100	102

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 3, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464556**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1824050											
QC1204163197 LCS											
2,4,5-T	40.0			48.6	ug/kg		122	(60%-139%)	LOF	11/27/18	17:25
2,4,5-TP	40.0			43.3	ug/kg		108	(62%-140%)			
2,4-D	40.0			42.1	ug/kg		105	(55%-140%)			
2,4-DB	40.0			43.8	ug/kg		110	(51%-152%)			
Dalapon	400			293	ug/kg		73	(32%-110%)			
Dicamba	40.0			40.7	ug/kg		102	(53%-135%)			
Dichlorprop	40.0			37.3	ug/kg		93	(52%-136%)			
Dinoseb	40.0		U	1.66	ug/kg		0 *	(24%-104%)			
MCPA	4000			3240	ug/kg		81	(44%-142%)			
MCPP	4000			3650	ug/kg		91	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			112	ug/kg		112	(37%-149%)			
QC1204163196 MB											
2,4,5-T			U	1.66	ug/kg					11/27/18	16:57
2,4,5-TP			U	1.66	ug/kg						

QC Summary

Workorder: **464556**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1824050												
2,4-D				U	1.66	ug/kg				LOF	11/27/18	16:57
2,4-DB				U	1.66	ug/kg						
Dalapon				U	35.0	ug/kg						
Dicamba				U	2.00	ug/kg						
Dichlorprop				U	2.26	ug/kg						
Dinoseb				U	1.66	ug/kg						
MCPA				U	230	ug/kg						
MCPP				U	200	ug/kg						
**2,4-Dichlorophenylacetic acid	100				108	ug/kg		108	(37%-149%)			
QC1204163198 464556001 MS												
2,4,5-T	40.9	U	1.70		36.6	ug/kg		89	(39%-144%)		11/27/18	18:22
2,4,5-TP	40.9	U	1.70		33.4	ug/kg		81	(40%-146%)			
2,4-D	40.9	U	1.70		37.6	ug/kg		92	(40%-149%)			
2,4-DB	40.9	U	1.70		33.4	ug/kg		81	(29%-160%)			
Dalapon	409	U	35.8		236	ug/kg		58	(19%-132%)			
Dicamba	40.9	U	2.05		31.6	ug/kg		77	(46%-135%)			

QC Summary

Workorder: **464556**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1824050											
Dichlorprop	40.9	U	2.31		28.1	ug/kg		69	(38%-145%)	LOF	11/27/18 18:22
Dinoseb	40.9	TU	1.70	TU	1.70	ug/kg		0*	(20%-118%)		
MCPA	4090	U	235		2230	ug/kg		55	(29%-154%)		
MCPP	4090	U	205	P	2740	ug/kg		67	(30%-135%)		
**2,4-Dichlorophenylacetic acid	102		98.5		89.6	ug/kg		88	(37%-149%)		
QC1204163199 464556001 MSD											
2,4,5-T	81.9	U	1.70		68.2	ug/kg	60*	83	(0%-30%)		11/27/18 18:50
2,4,5-TP	81.9	U	1.70		59.9	ug/kg	57*	73	(0%-30%)		
2,4-D	81.9	U	1.70	E	83.0	ug/kg	75*	101	(0%-30%)		
2,4-DB	81.9	U	1.70		57.6	ug/kg	53*	70	(0%-30%)		
Dalapon	819	U	35.8		388	ug/kg	49*	47	(0%-30%)		
Dicamba	81.9	U	2.05		56.6	ug/kg	57*	69	(0%-30%)		
Dichlorprop	81.9	U	2.31		52.0	ug/kg	60*	63	(0%-30%)		
Dinoseb	81.9	TU	1.70	TU	1.70	ug/kg	N/A	0*	(0%-30%)		
MCPA	8190	U	235		3760	ug/kg	51*	46	(0%-30%)		
MCPP	8190	U	205	P	4880	ug/kg	56*	60	(0%-30%)		

QC Summary

Workorder: **464556**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1824050											
**2,4-Dichlorophenylacetic acid	102	98.5		76.4	ug/kg		75	(37%-149%)	LOF	11/27/18	18:50

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL464714

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204166098	MB for batch 1825403	101	103
1204166099	LCS for batch 1825403	112	109
464714001	B3L1H3	79	86
464714002	B3L1H6	83	77
464714003	B3L1J5	75	68
464714004	B3L1J8	103	64
464714005	B3L1L0	164 *	84
464714006	B3L1L3	106	86
464714007	B3L1L6	247 *	80
464714008	B3L1M2	331 *	50
464714009	B3L1N1	40	41
464714010	B3L1N4	62	48
464714011	B3L1N7	144	55
464714012	B3L1P0	146	54
464714013	B3L1P9	50	51
464714014	B3L1R8	66	72
1204166100	B3L1H3MS	245 *	88
1204166102	B3L1H3MSD	247 *	88

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 30, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464714**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1825405											
QC1204166099 LCS											
2,4,5-T	40.0			46.4	ug/kg		116	(60%-139%)	LOF	11/29/18	22:19
2,4,5-TP	40.0			39.9	ug/kg		100	(62%-140%)			
2,4-D	40.0			41.6	ug/kg		104	(55%-140%)			
2,4-DB	40.0			37.4	ug/kg		94	(51%-152%)			
Dalapon	400			403	ug/kg		101	(32%-110%)			
Dicamba	40.0			39.9	ug/kg		100	(53%-135%)			
Dichlorprop	40.0			37.3	ug/kg		93	(52%-136%)			
Dinoseb	40.0			39.3	ug/kg		98	(24%-104%)			
MCPA	4000			3510	ug/kg		88	(44%-142%)			
MCPP	4000			3380	ug/kg		85	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			109	ug/kg		109	(37%-149%)			
QC1204166098 MB											
2,4,5-T			U	1.66	ug/kg					11/29/18	21:50
2,4,5-TP			U	1.66	ug/kg						

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **464714**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1825405											
2,4-D				U	1.66	ug/kg				LOF	11/29/18 21:50
2,4-DB				U	1.66	ug/kg					
Dalapon				U	35.0	ug/kg					
Dicamba				U	2.00	ug/kg					
Dichlorprop				U	2.26	ug/kg					
Dinoseb				U	1.66	ug/kg					
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	99.9				101	ug/kg		101	(37%-149%)		
QC1204166100 464714001 MS											
2,4,5-T	41.2	U	1.71		26.3	ug/kg		64	(39%-144%)		11/30/18 14:06
2,4,5-TP	41.2	U	1.71		24.3	ug/kg		59	(40%-146%)		
2,4-D	41.2	U	1.71	P	34.3	ug/kg		83	(40%-149%)		
2,4-DB	41.2	U	1.71		29.8	ug/kg		72	(29%-160%)		
Dalapon	412	U	36.1	P	176	ug/kg		43	(19%-132%)		
Dicamba	41.2	U	2.06		26.3	ug/kg		64	(46%-135%)		

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **464714**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1825405											
Dichlorprop	41.2	U	2.33	P	32.1	ug/kg		78	(38%-145%)	LOF	11/30/18 14:06
Dinoseb	41.2	TU	1.71	TU	1.71	ug/kg		0*	(20%-118%)		
MCPA	4120	U	237		3580	ug/kg		87	(29%-154%)		
MCPP	4120	U	206		3970	ug/kg		96	(30%-135%)		
**2,4-Dichlorophenylacetic acid	103		81.4		253	ug/kg		245*	(37%-149%)		
QC1204166102 464714001 MSD											
2,4,5-T	41.2	U	1.71		26.3	ug/kg	0	64	(0%-30%)		11/30/18 14:34
2,4,5-TP	41.2	U	1.71		24.4	ug/kg	1	59	(0%-30%)		
2,4-D	41.2	U	1.71	P	34.8	ug/kg	1	84	(0%-30%)		
2,4-DB	41.2	U	1.71		31.9	ug/kg	7	77	(0%-30%)		
Dalapon	412	U	36.1		176	ug/kg	0	43	(0%-30%)		
Dicamba	41.2	U	2.06		26.4	ug/kg	0	64	(0%-30%)		
Dichlorprop	41.2	U	2.33	P	31.4	ug/kg	2	76	(0%-30%)		
Dinoseb	41.2	TU	1.71	TU	1.71	ug/kg	N/A	0*	(0%-30%)		
MCPA	4120	U	237		3520	ug/kg	2	85	(0%-30%)		
MCPP	4120	U	206		3970	ug/kg	0	96	(0%-30%)		

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **464714**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1825405											
**2,4-Dichlorophenylacetic acid	103	81.4		255	ug/kg		247*	(37%-149%)	LOF	11/30/18	14:34

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Inorganics - Sample Data Groups (SDGs) SL31889-1 and SL31915-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31889-1 and SL31915-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1M6	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1M0	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1R3	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1K5	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1P4	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1K8	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1K2	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1J0	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1M9	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1R6	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1J3	11/14/18	Soil	C	6010D, 6020B, 7471B
B3L1L1	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1J6	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1N8	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1L4	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1H4	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1H7	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1L7	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1R0	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1P1	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1N2	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1N5	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1M3	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1J9	11/15/18	Soil	C	6010D, 6020B, 7471B
B3L1R9	11/15/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to ≤6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG SL31889-1, the Al and Ni laboratory blank results were detects > the method detection limits (MDLs) but < the reporting limits (RLs). All associated Al and Ni sample results were detects > the RL and >20X the blank values and data should not be qualified.

For SDG SL31915-1, the Ni laboratory blank result was > the MDL but < the RL. All associated Ni sample results were detects > the RL and >20X the blank value and should not be qualified as a result.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample and ICP-AES interference check sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31889-1, the MS and MSD recoveries for B were <30%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." The MS and MSD recoveries for Al and Mn were > the upper acceptance limit. All associated sample results were detects and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected samples.

For SL31915-1, the MS and MSD recoveries for B were < the lower acceptance limit but ≥30%. All associated sample were non-detects and should be qualified as estimates and flagged "UJ." The MS and MSD recoveries for Al and Mn were > the upper acceptance limit. All associated sample results were detects and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected sample results.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All required CRDLs for metals were met.

- **Completeness**

SDGs SL31889-1 and SL31915-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 98%.

MAJOR DEFICIENCIES

A major deficiency leading to qualification of the B results as unusable was due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of all affected sample results.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike recovery for B and high matrix spike recoveries for Al and Mn. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S742077-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S742077-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDGs: SL31889-1, SL31915-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
B	UR	B3L1M6, B3L1M0. B3L1R3, B3L1K5, B3L1P4, B3L1K8, B3L1K2, B3L1J0, B3L1M9, B3L1R6, B3L1J3	Very low matrix spike recoveries.
Al, Mn	J+	B3L1M6, B3L1M0. B3L1R3, B3L1K5, B3L1P4, B3L1K8, B3L1K2, B3L1J0, B3L1M9, B3L1R6, B3L1J3, B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1R0, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9	High matrix spike recoveries
B	UJ	B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1R0, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9	Low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE:		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/03/19	
			SDG: SL31889-1, SL31915-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SDG SL31889-1: B3L1M6, B3L1M0, B3L1R3, B3L1K5, B3L1P4, B3L1K8, B3L1K2, B3L1J0, B3L1M9, B3L1R6, B3L1J3					
SDG SL31915-1: B3L1L1, B3L1J6, B3L1N8, B3L1L4, B3L1H4, B3L1H7, B3L1L7, B3L1R0, B3L1P1, B3L1N2, B3L1N5, B3L1M3, B3L1J9, B3L1R9					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	Yes No (N/A)
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG SL31889-1: Al 2.16 mg/kg, Ni 0.264 mg/kg

SDG SL31915-1: Ni 0.205 mg/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

SDG SL31889-1: MS/MSD B 28%/0%: Al 210%/210%; Mn 142%/159%

SDG SL31915-1: MS/MSD B 38%/39%; Al 223%/276%, Mn 155%/171%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No (N/A)
ICP serial dilution %D values acceptable?	Yes No (N/A)
ICP post digestion spike required?	Yes No (N/A)
ICP post digestion spike values acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments (attach additional sheets as necessary):

CRDLs were provided for As, Be, Cd, Cr, Pb, Zn and Hg

Appendix 4

Additional Documentation Requested By Client

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31889-1
SDG: SL31889-1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-401978/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401978**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.3	U	9.4	2.3	mg/Kg		11/20/18 19:51	11/30/18 14:17	1
Lithium	1.4	U	4.7	1.4	mg/Kg		11/20/18 19:51	11/30/18 14:17	1

Lab Sample ID: LCS 160-401978/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401978**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.43	9.79		mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-401978/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401978**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	72.18	D	mg/Kg		78.8	53.5 - 124.5

Lab Sample ID: 160-31889-1 MS — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401978**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.8	U D N	18.9	5.34	B D N	mg/Kg	☼	28	75 - 125
Lithium	4.7	B D	9.47	14.54	D	mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-31889-1 MSD — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403812 — **Prep Batch: 401978**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.8	U D N	18.5	4.6	U D N	mg/Kg	☼	0	75 - 125	NC	30
Lithium	4.7	B D	9.27	13.99	D	mg/Kg	☼	100	75 - 125	4	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-401977/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401977**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.16	B D	4.7	1.9	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Arsenic	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Barium	0.47	U D	1.9	0.47	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Beryllium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Cadmium	0.022	U D	0.047	0.022	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Chromium	0.42	U D	0.94	0.42	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Cobalt	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Copper	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:50	11/30/18 20:40	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-401977/1-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401977

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.12	U D	0.28	0.12	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Manganese	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Molybdenum	0.19	U D	0.47	0.19	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Nickel	0.264	B D	0.47	0.19	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Selenium	0.30	U D	0.47	0.30	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Silver	0.070	U D	0.19	0.070	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Strontium	0.22	U D	0.47	0.22	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Tin	0.084	U D	0.19	0.084	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Uranium	0.037	U D	0.094	0.037	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Vanadium	0.37	U D	0.94	0.37	mg/Kg		11/20/18 19:50	11/30/18 20:40	2
Zinc	1.9	U D	4.7	1.9	mg/Kg		11/20/18 19:50	11/30/18 20:40	2

Lab Sample ID: LCS 160-401977/2-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401977

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	94.3	101.8	D	mg/Kg		108	80 - 120

Lab Sample ID: LCSSRM 160-401977/3-A
Matrix: Solid
Analysis Batch: 403828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401977

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7546	D	mg/Kg		90.3	50.2 - 149.5
Arsenic	161	181.8	D	mg/Kg		112.9	70.2 - 129.8
Barium	260	283.5	D	mg/Kg		109.1	75.0 - 125.0
Beryllium	97.6	106.2	D	mg/Kg		108.8	75.0 - 125.0
Cadmium	211	222.5	D	mg/Kg		105.4	74.9 - 125.1
Chromium	136	150.7	D	mg/Kg		110.8	70.0 - 130.1
Cobalt	48.2	54.58	D	mg/Kg		113.2	74.9 - 124.9
Copper	166	189.7	D	mg/Kg		114.3	74.7 - 124.7
Lead	111	117.3	D	mg/Kg		105.7	71.0 - 128.8
Manganese	288	239.0	D	mg/Kg		83.0	57.3 - 101.0
Molybdenum	110	120.6	D	mg/Kg		109.6	70.5 - 129.1
Nickel	91.9	105.4	D	mg/Kg		114.7	70.0 - 129.5
Selenium	191	216.2	D	mg/Kg		113.2	68.6 - 131.9
Silver	43.3	45.18	D	mg/Kg		104.3	69.5 - 130.5

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-401977/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401977**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Strontium	107	119.1	D	mg/Kg		111.3	72.1 - 128.0
Tin	99.9	105.0	D	mg/Kg		105.1	56.8 - 143.1
Vanadium	56.7	61.42	D	mg/Kg		108.3	56.8 - 143.4
Zinc	199	223.4	D	mg/Kg		112.3	69.8 - 130.2

Lab Sample ID: 160-31889-1 MS — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401977**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	4690	D	947	6678	D X	mg/Kg	☼	210	75 - 125
Arsenic	1.8	D	94.7	101.5	D	mg/Kg	☼	105	75 - 125
Barium	59.2	D	94.7	173.0	D	mg/Kg	☼	120	75 - 125
Beryllium	0.28	D	9.47	10.92	D	mg/Kg	☼	112	75 - 125
Cadmium	0.11	D	94.7	100.7	D	mg/Kg	☼	106	75 - 125
Chromium	7.4	D	94.7	91.78	D	mg/Kg	☼	89	75 - 125
Cobalt	10.7	D	94.7	107.1	D	mg/Kg	☼	102	75 - 125
Copper	16.8	D	94.7	114.0	D	mg/Kg	☼	103	75 - 125
Lead	2.9	D	94.7	104.9	D	mg/Kg	☼	108	75 - 125
Manganese	331	D N	94.7	465.1	D N	mg/Kg	☼	142	75 - 125
Molybdenum	0.40	B D	47.3	50.27	D	mg/Kg	☼	105	75 - 125
Nickel	15.1	D	94.7	107.3	D	mg/Kg	☼	97	75 - 125
Selenium	2.3	D	47.3	48.64	D	mg/Kg	☼	98	75 - 125
Silver	0.073	U D	18.9	20.09	D	mg/Kg	☼	106	75 - 125
Strontium	21.8	D	94.7	126.1	D	mg/Kg	☼	110	75 - 125
Tin	0.45	D	94.7	100.3	D	mg/Kg	☼	105	75 - 125
Uranium	0.50	D	94.7	106.4	D	mg/Kg	☼	112	75 - 125
Vanadium	76.0	D	94.7	166.7	D	mg/Kg	☼	96	75 - 125
Zinc	52.1	D	94.7	150.2	D	mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-31889-1 MSD — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401977**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	4690	D	927	6642	D X	mg/Kg	☼	210	75 - 125	1	30
Arsenic	1.8	D	92.7	99.36	D	mg/Kg	☼	105	75 - 125	2	30
Barium	59.2	D	92.7	162.9	D	mg/Kg	☼	112	75 - 125	6	30
Beryllium	0.28	D	9.27	10.27	D	mg/Kg	☼	108	75 - 125	6	30
Cadmium	0.11	D	92.7	93.08	D	mg/Kg	☼	100	75 - 125	8	30
Chromium	7.4	D	92.7	93.08	D	mg/Kg	☼	92	75 - 125	1	30
Cobalt	10.7	D	92.7	104.9	D	mg/Kg	☼	102	75 - 125	2	30
Copper	16.8	D	92.7	110.9	D	mg/Kg	☼	101	75 - 125	3	30
Lead	2.9	D	92.7	97.27	D	mg/Kg	☼	102	75 - 125	8	30
Manganese	331	D N	92.7	478.7	D N	mg/Kg	☼	159	75 - 125	3	30
Molybdenum	0.40	B D	46.4	47.72	D	mg/Kg	☼	102	75 - 125	5	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31889-1 MSD — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 403828 — **Prep Batch: 401977**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nickel	15.1	D	92.7	104.2	D	mg/Kg	☼	96	75 - 125	3	30
Selenium	2.3	D	46.4	49.44	D	mg/Kg	☼	102	75 - 125	2	30
Silver	0.073	U D	18.6	18.77	D	mg/Kg	☼	101	75 - 125	7	30
Strontium	21.8	D	92.7	119.7	D	mg/Kg	☼	106	75 - 125	5	30
Tin	0.45	D	92.7	94.66	D	mg/Kg	☼	102	75 - 125	6	30
Uranium	0.50	D	92.7	99.02	D	mg/Kg	☼	106	75 - 125	7	30
Vanadium	76.0	D	92.7	166.9	D	mg/Kg	☼	98	75 - 125	0	30
Zinc	52.1	D	92.7	147.1	D	mg/Kg	☼	102	75 - 125	2	30

Lab Sample ID: MB 160-401980/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404956 — **Prep Batch: 401980**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		11/20/18 19:56	12/10/18 17:29	2

Lab Sample ID: LCS 160-401980/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404956 — **Prep Batch: 401980**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	47.2	44.73	D	mg/Kg		95	21 - 251

Lab Sample ID: 160-31889-1 MS — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404956 — **Prep Batch: 401980**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.47	U D	45.0	44.13	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-31889-1 MSD — **Client Sample ID: B3L1M6**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404956 — **Prep Batch: 401980**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.47	U D	46.7	49.72	D	mg/Kg	☼	107	75 - 125	12	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402763/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403224 — **Prep Batch: 402763**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		11/27/18 11:00	11/28/18 14:57	1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: LCSSRM 160-402763/2-A ^10
Matrix: Solid
Analysis Batch: 403224

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402763

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	11.05	D	mg/Kg		96.1	59.7 - 139.1		

Lab Sample ID: 160-31889-1 MS
Matrix: Soil
Analysis Batch: 403224

Client Sample ID: B3L1M6
Prep Type: Total/NA
Prep Batch: 402763

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	0.951	1.02		mg/Kg	☼	107	80 - 120		

Lab Sample ID: 160-31889-1 MSD
Matrix: Soil
Analysis Batch: 403224

Client Sample ID: B3L1M6
Prep Type: Total/NA
Prep Batch: 402763

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.01	1.07		mg/Kg	☼	106	80 - 120	5	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: MB 160-402292/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	94		23 - 146	11/21/18 16:13	12/03/18 18:08	1

Lab Sample ID: LCS 160-402292/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	90		23 - 146

Lab Sample ID: 160-31887-C-6-C MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	82		23 - 146

Lab Sample ID: 160-31887-C-6-D MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	87		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-402141/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4	U	9.8	2.4	mg/Kg		11/21/18 12:35	12/04/18 16:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		11/21/18 12:35	12/04/18 16:04	1

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LCS 160-402141/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.43	8.56		mg/Kg		102	80 - 120

Lab Sample ID: LCSSRM 160-402141/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	78.41	D	mg/Kg		85.6	53.5 - 124.5

Lab Sample ID: 160-31915-11 MS — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U N D	19.2	7.22	B D N	mg/Kg	☼	38	75 - 125
Lithium	5.7	B D	9.62	15.97	D	mg/Kg	☼	106	75 - 125

Lab Sample ID: 160-31915-11 MSD — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U N D	20.0	7.87	B D N	mg/Kg	☼	39	75 - 125	9	30
Lithium	5.7	B D	10.0	16.97	D	mg/Kg	☼	112	75 - 125	6	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-402140/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.18	U D	0.46	0.18	mg/Kg		11/21/18 12:27	12/11/18 21:34	2

Lab Sample ID: LCS 160-402140/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	49.0	45.36	D	mg/Kg		93	21 - 251

Lab Sample ID: 160-31915-11 MS — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.46	U D	51.1	50.40	D	mg/Kg	☼	99	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31915-11 MSD — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.46	U D	47.1	49.93	D	mg/Kg	☼	106	75 - 125	1	30

Lab Sample ID: MB 160-402143/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Arsenic	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Barium	0.49	U D	2.0	0.49	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Cadmium	0.023	U D	0.049	0.023	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Cobalt	0.073	U D	0.20	0.073	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Copper	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Lead	0.12	U D	0.29	0.12	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Nickel	0.205	B D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Silver	0.073	U D	0.20	0.073	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Strontium	0.23	U D	0.49	0.23	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Tin	0.088	U D	0.20	0.088	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		11/21/18 12:38	12/05/18 17:27	2

Lab Sample ID: LCS 160-402143/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.3	88.70	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-402143/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8439	D	mg/Kg		100.9	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	285.6	D	mg/Kg		109.8	75.0 - 125.0
Beryllium	97.6	110.2	D	mg/Kg		112.9	75.0 - 125.0
Cadmium	211	231.2	D	mg/Kg		109.6	74.9 - 125.1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-402143/3-A
Matrix: Solid
Analysis Batch: 404280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	136	155.9	D	mg/Kg		114.6	70.0 - 130.1
Cobalt	48.2	55.52	D	mg/Kg		115.2	74.9 - 124.9
Copper	166	192.5	D	mg/Kg		115.9	74.7 - 124.7
Lead	111	123.8	D	mg/Kg		111.6	71.0 - 128.8
Manganese	288	252.7	D	mg/Kg		87.7	57.3 - 101.0
Molybdenum	110	124.8	D	mg/Kg		113.5	70.5 - 129.1
Nickel	91.9	107.1	D	mg/Kg		116.5	70.0 - 129.5
Selenium	191	216.2	D	mg/Kg		113.2	68.6 - 131.9
Silver	43.3	48.80	D	mg/Kg		112.7	69.5 - 130.5
Strontium	107	121.7	D	mg/Kg		113.7	72.1 - 128.0
Tin	99.9	111.9	D	mg/Kg		112.1	56.8 - 143.1
Vanadium	56.7	65.78	D	mg/Kg		116.0	56.8 - 143.4
Zinc	199	228.0	D	mg/Kg		114.6	69.8 - 130.2

Lab Sample ID: 160-31915-11 MS
Matrix: Soil
Analysis Batch: 404280

Client Sample ID: B3L1L1
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6760	D	962	8901	X D	mg/Kg	☼	223	75 - 125
Arsenic	2.2	D	96.2	96.54	D	mg/Kg	☼	98	75 - 125
Barium	88.2	D	96.2	190.8	D	mg/Kg	☼	107	75 - 125
Beryllium	0.40	D	9.62	10.92	D	mg/Kg	☼	109	75 - 125
Cadmium	0.084	D	96.2	98.83	D	mg/Kg	☼	103	75 - 125
Chromium	6.4	D	96.2	94.19	D	mg/Kg	☼	91	75 - 125
Cobalt	11.6	D	96.2	109.2	D	mg/Kg	☼	101	75 - 125
Copper	19.3	D	96.2	116.2	D	mg/Kg	☼	101	75 - 125
Lead	4.2	D	96.2	103.4	D	mg/Kg	☼	103	75 - 125
Manganese	407	D	96.2	557.1	X D	mg/Kg	☼	155	75 - 125
Molybdenum	0.46	B D	48.1	48.67	D	mg/Kg	☼	100	75 - 125
Nickel	11.3	D	96.2	106.8	D	mg/Kg	☼	99	75 - 125
Silver	0.11	B D	19.3	20.38	D	mg/Kg	☼	105	75 - 125
Strontium	24.3	D	96.2	124.4	D	mg/Kg	☼	104	75 - 125
Tin	0.74	D	96.2	99.77	D	mg/Kg	☼	103	75 - 125
Uranium	0.46	D	96.2	103.4	D	mg/Kg	☼	107	75 - 125
Vanadium	87.7	D	96.2	184.1	D	mg/Kg	☼	100	75 - 125
Zinc	58.0	D	96.2	152.5	D	mg/Kg	☼	98	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31915-11 MS — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404665 — **Prep Batch: 402143**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	2.2	D	48.1	45.50	D	mg/Kg	☼	90	75 - 125

Lab Sample ID: 160-31915-11 MSD — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6760	D	1000	9518	X D	mg/Kg	☼	276	75 - 125	7	30
Arsenic	2.2	D	100	98.99	D	mg/Kg	☼	97	75 - 125	3	30
Barium	88.2	D	100	195.9	D	mg/Kg	☼	108	75 - 125	3	30
Beryllium	0.40	D	10.0	11.36	D	mg/Kg	☼	110	75 - 125	4	30
Cadmium	0.084	D	100	102.4	D	mg/Kg	☼	102	75 - 125	4	30
Chromium	6.4	D	100	98.92	D	mg/Kg	☼	92	75 - 125	5	30
Cobalt	11.6	D	100	110.6	D	mg/Kg	☼	99	75 - 125	1	30
Copper	19.3	D	100	118.7	D	mg/Kg	☼	99	75 - 125	2	30
Lead	4.2	D	100	107.4	D	mg/Kg	☼	103	75 - 125	4	30
Manganese	407	D	100	578.5	X D	mg/Kg	☼	171	75 - 125	4	30
Molybdenum	0.46	B D	50.0	50.44	D	mg/Kg	☼	100	75 - 125	4	30
Nickel	11.3	D	100	112.7	D	mg/Kg	☼	101	75 - 125	5	30
Silver	0.11	B D	20.0	20.98	D	mg/Kg	☼	104	75 - 125	3	30
Strontium	24.3	D	100	126.9	D	mg/Kg	☼	102	75 - 125	2	30
Tin	0.74	D	100	103.6	D	mg/Kg	☼	103	75 - 125	4	30
Uranium	0.46	D	100	106.8	D	mg/Kg	☼	106	75 - 125	3	30
Vanadium	87.7	D	100	185.7	D	mg/Kg	☼	98	75 - 125	1	30
Zinc	58.0	D	100	155.1	D	mg/Kg	☼	97	75 - 125	2	30

Lab Sample ID: 160-31915-11 MSD — **Client Sample ID: B3L1L1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404665 — **Prep Batch: 402143**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	2.2	D	50.0	47.59	D	mg/Kg	☼	91	75 - 125	4	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402764/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403224 — **Prep Batch: 402764**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		11/27/18 11:01	11/28/18 15:38	1

Lab Sample ID: LCSSRM 160-402764/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403224 — **Prep Batch: 402764**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	11.02	D	mg/Kg		95.9	59.7 - 139.1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-047

TestAmerica Job ID: 160-31915-1
SDG: SL31915-1

Lab Sample ID: 160-31915-11 MS
Matrix: Soil
Analysis Batch: 403224

Client Sample ID: B3L1L1
Prep Type: Total/NA
Prep Batch: 402764

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	0.978	1.05		mg/Kg	☼	107	80 - 120		

Lab Sample ID: 160-31915-11 MSD
Matrix: Soil
Analysis Batch: 403224

Client Sample ID: B3L1L1
Prep Type: Total/NA
Prep Batch: 402764

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	0.985	1.03		mg/Kg	☼	105	80 - 120	2	30

Date: 03 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8718-1 and RL8734-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8718-1 and RL8734-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L1F3	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C9	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F7	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D0	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D8	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F6	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D1	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C5	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D7	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C6	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D5	11/14/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F8	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D2	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D3	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C7	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C4	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D6	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F0	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F5	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C8	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F1	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1F2	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1C3	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D9	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241
B3L1D4	11/15/18	Soil	C	Iso-U, Iso-Pu, Co-60, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil/solid analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided in the SAP.

- **Completeness**

SDGs RL8718-1 and RL8734-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8718-1, RL8734-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E

Project: RTL	Data Package: VSR19-010
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/03/19
	SDG: RL8718-1, RL8734-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241 (LSC)		

Samples/Matrix Soil

SDG RL8718-1: B3L1F3, B3L1C9, B3L1F7, B3L1D0, B3L1D8, B3L1F6, B3L1D1, B3L1C5, B3L1D7, B3L1C6, B3L1D5

SDG RL8734-1: B3L1F8, B3L1D2, B3L1D3, B3L1C7, B3L1C4, B3L1D6, B3L1F0, B3L1F5, B3L1C8, B3L1F1, B3L1F2, B3L1C3, B3L1D9, B3L1D4

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☒ N/A
Chemical carrier added?	Yes No (N/A)
Chemical recovery acceptable?	Yes No (N/A)
Chemical carrier traceable? (Levels D, E)	Yes No (N/A)
Chemical carrier expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	(Yes) No N/A
Tracer recovery acceptable?	(Yes) No N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No (N/A)
Spike recoveries acceptable?	Yes No (N/A)
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

RPD's are >30%; however parent and/or duplicate results were <MDCs.

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split sample(s) analyzed?	Yes (No) N/A
Field split RPD values acceptable?	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	(Yes) No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	(Yes) No N/A
Results supported in raw data?(Levels D, E)	Yes No (N/A)
Results acceptable? (Levels D, E)	Yes No (N/A)
MDC's meet required reporting limits?	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided in SAP

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8718-1	B3L1F3	97.5
300-8718-1 DU	B3L1F3	99.9
300-8718-2	B3L1C9	71.8
300-8718-3	B3L1F7	90.0
300-8718-5	B3L1D0	95.4
300-8718-6	B3L1D8	67.1
300-8718-7	B3L1F6	98.3
300-8718-9	B3L1D1	94.4
300-8718-10	B3L1C5	88.0
300-8718-12	B3L1D7	89.5
300-8718-14	B3L1C6	93.3
300-8718-16	B3L1D5	92.6
LCS 300-16199/1-A	Lab Control Sample	97.0
MB 300-15927/1-A	Method Blank	105

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8718-1	B3L1F3	50.9
300-8718-1 DU	B3L1F3	81.1
300-8718-2	B3L1C9	52.3
300-8718-3	B3L1F7	77.6
300-8718-5	B3L1D0	78.3
300-8718-6	B3L1D8	57.5
300-8718-7	B3L1F6	75.9
300-8718-9	B3L1D1	79.5
300-8718-10	B3L1C5	80.2
300-8718-12	B3L1D7	74.4
300-8718-14	B3L1C6	91.6
300-8718-16	B3L1D5	74.9
LCS 300-15933/2-A	Lab Control Sample	74.3
MB 300-15933/1-A	Method Blank	58.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8718-1	B3L1F3	97.5
300-8718-1 DU	B3L1F3	99.9

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8718-1
SDG: RL8718-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

			Percent Yield (Acceptance Limits)						
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8718-2	B3L1C9	71.8							
300-8718-3	B3L1F7	90.0							
300-8718-5	B3L1D0	95.4							
300-8718-6	B3L1D8	67.1							
300-8718-7	B3L1F6	98.3							
300-8718-9	B3L1D1	94.4							
300-8718-10	B3L1C5	88.0							
300-8718-12	B3L1D7	89.5							
300-8718-14	B3L1C6	93.3							
300-8718-16	B3L1D5	92.6							
LCS 300-15932/2-A	Lab Control Sample	111							
MB 300-15932/1-A	Method Blank	105							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15968/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0107	U		0.0710	0.370	0.0604	pCi/g	11/20/18 12:41	11/28/18 12:13	1

Lab Sample ID: LCS 300-15968/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.64	2.689		0.203	0.370	0.0914	pCi/g	102	80 - 120

Lab Sample ID: 300-8718-1 DU — **Client Sample ID: B3L1F3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16217 — **Prep Batch: 15968**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.026	U	-0.0687	U y	0.110	0.370	0.0698	pCi/g	89	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-15933/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16261 — **Prep Batch: 15933**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.0108	U	0.0420	0.0421	1.00	0.111	pCi/g	11/17/18 08:15	11/30/18 08:45	1
U-233/234	0.0167	U	0.0418	0.0419	1.00	0.0937	pCi/g	11/17/18 08:15	11/30/18 08:45	1
U-235/236	-0.00167	U	0.0417	0.0417	1.00	0.0822	pCi/g	11/17/18 08:15	11/30/18 08:45	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*58.7*		*30 - 105*	*11/17/18 08:15*	*11/30/18 08:45*	*1*

Lab Sample ID: LCS 300-15933/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16261 — **Prep Batch: 15933**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	1.78	1.872		0.462	1.00	0.0773	pCi/g	105	80 - 120
U-233/234	1.70	1.403		0.378	1.00	0.0773	pCi/g	82	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*74.3*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8718-1 DU
Matrix: Solid
Analysis Batch: 16261

Client Sample ID: B3L1F3
Prep Type: Total/NA
Prep Batch: 15933

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0338	U		0.168	y	0.103	1.00	0.0703	pCi/g			133	30
U-233/234	0.0732	U		0.0838		0.0716	1.00	0.0623	pCi/g			14	30
U-235/236	0.0156	U		-0.000575	U y	0.0287	1.00	0.0527	pCi/g			215	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*81.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-15927/1-A
Matrix: Solid
Analysis Batch: 16197

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 15927

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00246	U	0.0309	0.0309	1.00	0.0700	pCi/g	11/17/18 07:22	11/28/18 16:17	1
Pu-239/240	-0.00493	U	0.0310	0.0310	1.00	0.0789	pCi/g	11/17/18 07:22	11/28/18 16:17	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*105*		*30 - 105*	*11/17/18 07:22*	*11/28/18 16:17*	*1*

Lab Sample ID: 300-8718-1 DU
Matrix: Solid
Analysis Batch: 16197

Client Sample ID: B3L1F3
Prep Type: Total/NA
Prep Batch: 15927

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0044	U		-0.00218	U y	0.0273	1.00	0.0591	pCi/g			68	30
Pu-239/240	-0.0098	U		-0.00327	U y	0.0273	1.00	0.0631	pCi/g			100	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*99.9*		*30 - 105*

Lab Sample ID: LCS 300-16199/1-A
Matrix: Solid
Analysis Batch: 16208

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16199

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.849	0.844		0.252	1.00	0.0803	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.0*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-15932/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16241 — **Prep Batch: 15932**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.572	U	0.0738	1.24	15.0	2.01	pCi/g	11/17/18 08:06	11/29/18 16:14	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*105*			*11/17/18 08:06*	*11/29/18 16:14*	*1*

Lab Sample ID: LCS 300-15932/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16241 — **Prep Batch: 15932**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			211	231.9		14.7	15.0	1.92	pCi/g	110	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*111*		

Lab Sample ID: 300-8718-1 DU — **Client Sample ID: B3L1F3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16241 — **Prep Batch: 15932**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.48	U		1.143	U	1.24	15.0	1.96	pCi/g			26	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*99.9*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8734-1	B3L1F8	89.9
300-8734-1 DU	B3L1F8	93.5
300-8734-2	B3L1D2	94.9
300-8734-3	B3L1D3	88.1
300-8734-4	B3L1C7	87.9
300-8734-5	B3L1C4	83.4
300-8734-6	B3L1D6	85.7
300-8734-7	B3L1F0	99.5
300-8734-8	B3L1F5	74.3
300-8734-9	B3L1C8	101
300-8734-10	B3L1F1	91.4
300-8734-11	B3L1F2	99.1
300-8734-12	B3L1C3	96.3
300-8734-13	B3L1D9	83.2
300-8734-14	B3L1D4	82.4
LCS 300-16111/2-A	Lab Control Sample	97.6
MB 300-16111/1-A	Method Blank	90.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8734-1	B3L1F8	89.6
300-8734-1 DU	B3L1F8	78.4
300-8734-2	B3L1D2	96.4
300-8734-3	B3L1D3	86.7
300-8734-4	B3L1C7	85.3
300-8734-5	B3L1C4	99.0
300-8734-6	B3L1D6	92.8
300-8734-7	B3L1F0	84.2
300-8734-8	B3L1F5	87.2
300-8734-9	B3L1C8	89.9
300-8734-10	B3L1F1	100
300-8734-11	B3L1F2	79.6
300-8734-12	B3L1C3	81.9
300-8734-13	B3L1D9	75.5
300-8734-14	B3L1D4	82.7
LCS 300-16137/2-A	Lab Control Sample	81.6
MB 300-16137/1-A	Method Blank	83.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-046

TestAmerica Job ID: 300-8734-1
SDG: RL8734-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8734-1	B3L1F8	89.9							
300-8734-1 DU	B3L1F8	93.5							
300-8734-2	B3L1D2	94.9							
300-8734-3	B3L1D3	88.1							
300-8734-4	B3L1C7	87.9							
300-8734-5	B3L1C4	83.4							
300-8734-6	B3L1D6	85.7							
300-8734-7	B3L1F0	99.5							
300-8734-8	B3L1F5	74.3							
300-8734-9	B3L1C8	101							
300-8734-10	B3L1F1	91.4							
300-8734-11	B3L1F2	99.1							
300-8734-12	B3L1C3	96.3							
300-8734-13	B3L1D9	83.2							
300-8734-14	B3L1D4	82.4							
LCS 300-16134/2-A	Lab Control Sample	97.6							
MB 300-16134/1-A	Method Blank	90.4							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16098/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0118	U		0.0136	0.370	0.0442	pCi/g	11/27/18 09:32	11/27/18 15:48	1

Lab Sample ID: LCS 300-16098/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.64	2.313		0.181	0.370	0.101	pCi/g	88	80 - 120		

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16176 — **Prep Batch: 16098**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.032	U		-0.0446	U y	0.0949	0.370	0.0780	pCi/g			34	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16137/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16428 — **Prep Batch: 16137**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00714	U	0.0277	0.0278	1.00	0.0744	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-233/234	-0.00275	U	0.0276	0.0276	1.00	0.0618	pCi/g	11/27/18 15:07	12/04/18 14:24	1
U-235/236	-0.00110	U	0.0275	0.0275	1.00	0.0542	pCi/g	11/27/18 15:07	12/04/18 14:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*83.1*		*30 - 105*	*11/27/18 15:07*	*12/04/18 14:24*	*1*

Lab Sample ID: LCS 300-16137/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16428 — **Prep Batch: 16137**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.41	2.665	o	0.578	1.00	0.0685	pCi/g	78	80 - 120		
U-233/234			3.26	3.563		0.725	1.00	0.0722	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*81.6*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8734-1 DU
Matrix: Solid
Analysis Batch: 16428

Client Sample ID: B3L1F8
Prep Type: Total/NA
Prep Batch: 16137

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0541	U o		0.0682	U o	0.0661	1.00	0.0714	pCi/g			23	30
U-233/234	0.218			0.0548	U y	0.0590	1.00	0.0677	pCi/g			120	30
U-235/236	-0.0064	U		-0.000583	U y	0.0292	1.00	0.0535	pCi/g			167	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*78.4*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16111/1-A
Matrix: Solid
Analysis Batch: 16397

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16111

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00895	U	0.0323	0.0323	1.00	0.0881	pCi/g	11/27/18 11:50	12/04/18 17:24	1
Pu-239/240	-0.00192	U	0.0320	0.0320	1.00	0.0665	pCi/g	11/27/18 11:50	12/04/18 17:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*90.4*		*30 - 105*	*11/27/18 11:50*	*12/04/18 17:24*	*1*

Lab Sample ID: LCS 300-16111/2-A
Matrix: Solid
Analysis Batch: 16397

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16111

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.45	4.926		0.921	1.00	0.0579	pCi/g	111	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*97.6*		*30 - 105*

Lab Sample ID: 300-8734-1 DU
Matrix: Solid
Analysis Batch: 16397

Client Sample ID: B3L1F8
Prep Type: Total/NA
Prep Batch: 16111

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.00723	U		-0.00502	U y	0.0316	1.00	0.0768	pCi/g			1110	30
Pu-239/240	-0.0072	U		-0.00314	U y	0.0315	1.00	0.0706	pCi/g			79	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*93.5*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16134/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	2.360	U	0.142	1.59	15.0	2.51	pCi/g	11/27/18 14:56	12/11/18 17:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*90.4*			*11/27/18 14:56*	*12/11/18 17:05*	*1*

Lab Sample ID: LCS 300-16134/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			222	237.4		15.7	15.0	2.23	pCi/g	107	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*97.6*		

Lab Sample ID: 300-8734-1 DU — **Client Sample ID: B3L1F8**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16771 — **Prep Batch: 16134**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.87	U		0.134	U y	1.43	15.0	2.44	pCi/g			173	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*93.5*		

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01/28/2019	
3. Project No.	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-014		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
01/28/2019 Date Scot Fitzgerald Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/28/19 Date Reviewer/Point of Contact (print and sign) Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	On Page 93 under precision, for SDG SL32166-1 The RPD failure is for endosulfan II instead of I		Correct narrative and summary accordingly	Y		closed
2	On page 165 for MCPP it lists a low matrix spike as part of the flag criteria for MCPP SDG GEL466373 batch 1831925, the narrative correctly calls out a high spike failure with no flagging. The Flagging for precision failure is correct.		Remove the Low matrix spike recovery comment from this section of the qualification summary.	Y		closed
3	On page 164 dalapon for sample B3L2T2 poor precision is listed under reason - dalapon precision passed (narrative and checklist are okay		Remove the poor precision from this section of the qualification summary.	Y		closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
1/28/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-014 VSR19-014 Rev.1		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/28/2019 Jadie Kaas Date / Organization Manager (optional) (print and sign)	Reviewer/Point of Contact (print and sign) Date Author/Originator (print and sign)	1/28/19 Jadie Kaas Date / Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No other issues noted than the Three comments reported on Scot Fitzgerald's RCR dated 1/28/19					Closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-014
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-23-2019**

Technical Review By: Ellen McEntee **Date: 01-24-2019**

Quality Review By: Mary A. Donivan **Date: 01-29-2019**
Mary Donivan
Quality Assurance Manager

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Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Group (SDGs) SL32166-1, SL32196-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32166-1 and SL32196-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2L3	12/05/18	Soil	C	8260C
B3L2K1	12/05/18	Soil	C	8260C
B3L2L9	12/05/18	Soil	C	8260C
B3L2P6	12/05/18	Soil	C	8260C
B3L2J5	12/05/18	Soil	C	8260C
B3L2M8	12/05/18	Soil	C	8260C
B3L2P9	12/05/18	Soil	C	8260C
B3L2N1	12/05/18	Soil	C	8260C
B3L2L0	12/05/18	Soil	C	8260C
B3L2R2	12/05/18	Soil	C	8260C
B3L2M2	12/05/18	Soil	C	8260C
B3L2R5	12/05/18	Soil	C	8260C
B3L2M5	12/05/18	Soil	C	8260C
B3L2K7	12/05/18	Soil	C	8260C
B3L2T4	12/05/18	Soil	C	8260C
B3L2J8	12/05/18	Soil	C	8260C
B3L2R8	12/05/18	Soil	C	8260C
B3L2V1	12/05/18	Soil	C	8260C
B3L2K4	12/06/18	Soil	C	8260C
B3L2N7	12/06/18	Soil	C	8260C
B3L2P3	12/06/18	Soil	C	8260C
B3L2T1	12/06/18	Soil	C	8260C
B3L2N4	12/06/18	Soil	C	8260C
B3L2L6	12/06/18	Soil	C	8260C
B3L2P0	12/06/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved with the following exceptions.

For SDG SL32196-1, all samples were prepped beyond but within 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exception.

For SDG SL32166-1, the 4-bromofluorobenzene surrogate recovery for sample B3L2R8 was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and all other surrogate recoveries were within the acceptance limit, therefore data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception.

For SDG SL32166-1, the MSD recovery for chloroethane was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32166-1, the LCS recovery for chloroethane was below the lower acceptance limit. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

LCS/LCSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The CRDL for methylene chloride was met. No other VOCs CRDLs were provided in the SAP.

- **Completeness**

SDG SL32166-1 and SL32196-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 72%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of sample results as unusable were due to missed holding times. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike and low LCS recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDGs: SL32166-1, SL32196-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
All VOC analytes	UR	B3L2K4, B3L2N7, B3L2P3, B3L2T1, B3L2N4, B3L2L6, B3L2P0	Analyzed beyond but within 2X the holding time
chloroethane	UJ	B3L2L3, B3L2K1, B3L2L9, B3L2P6, B3L2J5, B3L2M8, B3L2P9, B3L2N1, B3L2L0, B3L2R2, B2L2M2, B3L2R5, B3L2M5, B3L2K7, B3L2T4, B3L2J8, B3L2R8, B3L2V1	Low matrix spike recovery and low LCS recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/23/19	
			SDG: SL32166-1, SL32196-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SL32166-1: B3L2L3, B3L2K1, B3L2L9, B3L2P6, B3L2J5, B3L2M8, B3L2P9, B3L2N1, B3L2L0, B3L2R2, B3L2M2, B3L2R5, B3L2M5, B3L2K7, B3L2T4, B3L2J8, B3L2R8, B3L2V1,					
SL32196-1: B3L2K4, B3L2N7, B3L2P3, B3L2T1, B3L2N4, B3L2L6, B3L2P0,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate
SL32166-1:B3L2R8 BFB 137%

MS/MSD
SL32166-1: chloroethane 69% (MSD)

LCS/LCSD
SL32166-1: chloroethane 66%/65%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SL32196-1: all samples were prepped 21 days after collection

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDL for methylene chloride were met. no other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-406531/8
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/19/18 11:26	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/19/18 11:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/19/18 11:26	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/19/18 11:26	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/19/18 11:26	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/19/18 11:26	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/19/18 11:26	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/19/18 11:26	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/19/18 11:26	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/19/18 11:26	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/19/18 11:26	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/19/18 11:26	1
Acetone	6.5	U	20	6.5	ug/Kg			12/19/18 11:26	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/19/18 11:26	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/19/18 11:26	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/19/18 11:26	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/19/18 11:26	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/19/18 11:26	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/19/18 11:26	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/19/18 11:26	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/19/18 11:26	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/19/18 11:26	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/19/18 11:26	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/19/18 11:26	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/19/18 11:26	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/19/18 11:26	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/19/18 11:26	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/19/18 11:26	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/19/18 11:26	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/19/18 11:26	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/19/18 11:26	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/19/18 11:26	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/19/18 11:26	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/19/18 11:26	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/19/18 11:26*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*		*12/19/18 11:26*	*1*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*		*12/19/18 11:26*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 143*		*12/19/18 11:26*	*1*
Toluene-d8 (Surr)	*105*		*74 - 135*		*12/19/18 11:26*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406531/5
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	46.9		ug/Kg		94	71 - 127
1,1,2,2-Tetrachloroethane	50.0	61.4		ug/Kg		123	52 - 140
1,1,2-Trichloroethane	50.0	57.5		ug/Kg		115	79 - 122
1,1-Dichloroethane	50.0	48.6		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	53.6		ug/Kg		107	71 - 126
1,2-Dichloroethane	50.0	48.7		ug/Kg		97	68 - 128
1,2-Dichloroethene, Total	100	110		ug/Kg		110	79 - 121
1,2-Dichloropropane	50.0	54.4		ug/Kg		109	80 - 126
2-Butanone (MEK)	50.0	59.9		ug/Kg		120	41 - 140
2-Hexanone	50.0	54.3		ug/Kg		109	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	53.1		ug/Kg		106	67 - 130
Acetone	50.0	50.5		ug/Kg		101	39 - 140
Benzene	50.0	51.6		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	50.5		ug/Kg		101	78 - 124
Bromoform	50.0	58.0		ug/Kg		116	67 - 135
Bromomethane	50.0	40.8		ug/Kg		82	61 - 132
Carbon disulfide	50.0	50.8		ug/Kg		102	74 - 124
Carbon tetrachloride	50.0	46.9		ug/Kg		94	68 - 130
Chlorobenzene	50.0	52.6		ug/Kg		105	80 - 120
Chloroethane	50.0	32.8	o	ug/Kg		66	73 - 129
Chloroform	50.0	46.6		ug/Kg		93	78 - 120
Chloromethane	50.0	44.1		ug/Kg		88	69 - 123
cis-1,3-Dichloropropene	50.0	57.8		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	54.4		ug/Kg		109	77 - 126
Ethylbenzene	50.0	49.5		ug/Kg		99	79 - 126
Methylene Chloride	50.0	55.5		ug/Kg		111	76 - 120
Styrene	50.0	56.2		ug/Kg		112	80 - 129
Tetrachloroethene	50.0	52.0		ug/Kg		104	76 - 126
Toluene	50.0	55.2		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	55.2		ug/Kg		110	77 - 136
Trichloroethene	50.0	50.3		ug/Kg		101	66 - 130
Vinyl chloride	50.0	40.2		ug/Kg		80	56 - 134
Xylenes, Total	100	110		ug/Kg		110	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: LCSD 160-406531/6
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	46.2		ug/Kg		92	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	55.5		ug/Kg		111	52 - 140	10	20
1,1,2-Trichloroethane	50.0	55.4		ug/Kg		111	79 - 122	4	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406531/6
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	47.3		ug/Kg		95	80 - 120	3	20
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126	2	20
1,2-Dichloroethane	50.0	45.4		ug/Kg		91	68 - 128	7	20
1,2-Dichloroethene, Total	100	109		ug/Kg		109	79 - 121	1	20
1,2-Dichloropropane	50.0	52.1		ug/Kg		104	80 - 126	4	20
2-Butanone (MEK)	50.0	52.1		ug/Kg		104	41 - 140	14	20
2-Hexanone	50.0	49.1		ug/Kg		98	63 - 136	10	20
4-Methyl-2-pentanone (MIBK)	50.0	47.9		ug/Kg		96	67 - 130	10	20
Acetone	50.0	42.8		ug/Kg		86	39 - 140	16	20
Benzene	50.0	50.7		ug/Kg		101	80 - 120	2	20
Bromodichloromethane	50.0	48.7		ug/Kg		97	78 - 124	4	20
Bromoform	50.0	51.1		ug/Kg		102	67 - 135	13	20
Bromomethane	50.0	38.6		ug/Kg		77	61 - 132	6	20
Carbon disulfide	50.0	49.8		ug/Kg		100	74 - 124	2	20
Carbon tetrachloride	50.0	45.6		ug/Kg		91	68 - 130	3	20
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120	2	20
Chloroethane	50.0	32.6	o	ug/Kg		65	73 - 129	1	20
Chloroform	50.0	45.8		ug/Kg		92	78 - 120	2	20
Chloromethane	50.0	42.8		ug/Kg		86	69 - 123	3	20
cis-1,3-Dichloropropene	50.0	56.4		ug/Kg		113	78 - 127	2	20
Dibromochloromethane	50.0	52.5		ug/Kg		105	77 - 126	4	20
Ethylbenzene	50.0	50.7		ug/Kg		101	79 - 126	2	20
Methylene Chloride	50.0	53.0		ug/Kg		106	76 - 120	5	20
Styrene	50.0	57.1		ug/Kg		114	80 - 129	2	20
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126	1	20
Toluene	50.0	55.7		ug/Kg		111	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	54.4		ug/Kg		109	77 - 136	1	20
Trichloroethene	50.0	49.8		ug/Kg		100	66 - 130	1	20
Vinyl chloride	50.0	39.6		ug/Kg		79	56 - 134	1	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: 160-32166-1 MS
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.37	U	46.7	45.3		ug/Kg	☼	97	80 - 120
1,1,2,2-Tetrachloroethane	1.7	U	46.7	39.8		ug/Kg	☼	85	78 - 120
1,1,2-Trichloroethane	1.0	U	46.7	51.3		ug/Kg	☼	110	80 - 120
1,1-Dichloroethane	0.34	U	46.7	47.3		ug/Kg	☼	101	80 - 120
1,1-Dichloroethene	1.4	U	46.7	48.1		ug/Kg	☼	103	78 - 121
1,2-Dichloroethane	0.75	U	46.7	44.2		ug/Kg	☼	95	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32166-1 MS
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.2	U	93.3	102		ug/Kg	☼	109	80 - 120
1,2-Dichloropropane	0.52	U	46.7	50.6		ug/Kg	☼	109	80 - 120
2-Butanone (MEK)	1.7	U	46.7	41.4		ug/Kg	☼	89	69 - 124
2-Hexanone	2.9	U	46.7	38.8		ug/Kg	☼	83	62 - 118
4-Methyl-2-pentanone (MIBK)	2.2	U	46.7	38.4		ug/Kg	☼	82	73 - 125
Acetone	5.6	U	46.7	41.0		ug/Kg	☼	88	54 - 139
Benzene	0.22	U	46.7	49.0		ug/Kg	☼	105	80 - 120
Bromodichloromethane	0.43	U	46.7	48.7		ug/Kg	☼	104	80 - 120
Bromoform	1.7	U	46.7	49.2		ug/Kg	☼	105	80 - 125
Bromomethane	2.0	U	46.7	39.6		ug/Kg	☼	85	70 - 126
Carbon disulfide	0.60	U	46.7	45.6		ug/Kg	☼	98	79 - 121
Carbon tetrachloride	0.44	U	46.7	44.3		ug/Kg	☼	95	80 - 120
Chlorobenzene	0.70	U	46.7	49.5		ug/Kg	☼	106	80 - 120
Chloroethane	1.7	U o	46.7	32.9		ug/Kg	☼	71	64 - 133
Chloroform	0.33	U	46.7	45.0		ug/Kg	☼	97	80 - 120
Chloromethane	0.56	U	46.7	41.3		ug/Kg	☼	89	75 - 120
cis-1,3-Dichloropropene	1.8	U	46.7	51.8		ug/Kg	☼	111	80 - 120
Dibromochloromethane	1.1	U	46.7	50.1		ug/Kg	☼	107	80 - 120
Ethylbenzene	0.60	U	46.7	48.3		ug/Kg	☼	103	80 - 120
Methylene Chloride	1.4	U	46.7	50.6		ug/Kg	☼	109	77 - 123
Styrene	1.7	U	46.7	54.3		ug/Kg	☼	116	80 - 120
Tetrachloroethene	0.49	U	46.7	46.9		ug/Kg	☼	100	80 - 120
Toluene	2.2	U	46.7	54.2		ug/Kg	☼	116	80 - 124
trans-1,3-Dichloropropene	1.5	U	46.7	48.0		ug/Kg	☼	103	80 - 122
Trichloroethene	0.34	U	46.7	56.1		ug/Kg	☼	120	79 - 120
Vinyl chloride	0.37	U	46.7	37.3		ug/Kg	☼	80	71 - 120
Xylenes, Total	0.73	U	93.3	104		ug/Kg	☼	111	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.37	U	48.3	46.4		ug/Kg	☼	96	80 - 120	2	20
1,1,2,2-Tetrachloroethane	1.7	U	48.3	43.6		ug/Kg	☼	90	78 - 120	9	20
1,1,2-Trichloroethane	1.0	U	48.3	50.3		ug/Kg	☼	104	80 - 120	2	20
1,1-Dichloroethane	0.34	U	48.3	48.7		ug/Kg	☼	101	80 - 120	3	20
1,1-Dichloroethene	1.4	U	48.3	50.7		ug/Kg	☼	105	78 - 121	5	20
1,2-Dichloroethane	0.75	U	48.3	44.6		ug/Kg	☼	92	78 - 117	1	20
1,2-Dichloroethene, Total	1.2	U	96.5	108		ug/Kg	☼	112	80 - 120	6	20
1,2-Dichloropropane	0.52	U	48.3	52.9		ug/Kg	☼	110	80 - 120	4	20
2-Butanone (MEK)	1.7	U	48.3	42.3		ug/Kg	☼	88	69 - 124	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	2.9	U	48.3	38.9		ug/Kg	☼	81	62 - 118	0	20
4-Methyl-2-pentanone (MIBK)	2.2	U	48.3	39.7		ug/Kg	☼	82	73 - 125	3	20
Acetone	5.6	U	48.3	44.2		ug/Kg	☼	92	54 - 139	8	20
Benzene	0.22	U	48.3	51.6		ug/Kg	☼	107	80 - 120	5	20
Bromodichloromethane	0.43	U	48.3	49.7		ug/Kg	☼	103	80 - 120	2	20
Bromoform	1.7	U	48.3	49.2		ug/Kg	☼	102	80 - 125	0	20
Bromomethane	2.0	U	48.3	39.9		ug/Kg	☼	83	70 - 126	1	20
Carbon disulfide	0.60	U	48.3	48.1		ug/Kg	☼	100	79 - 121	5	20
Carbon tetrachloride	0.44	U	48.3	45.7		ug/Kg	☼	95	80 - 120	3	20
Chlorobenzene	0.70	U	48.3	50.3		ug/Kg	☼	104	80 - 120	2	20
Chloroethane	1.7	U o	48.3	33.2		ug/Kg	☼	69	64 - 133	1	20
Chloroform	0.33	U	48.3	47.2		ug/Kg	☼	98	80 - 120	5	20
Chloromethane	0.56	U	48.3	41.9		ug/Kg	☼	87	75 - 120	1	20
cis-1,3-Dichloropropene	1.8	U	48.3	54.4		ug/Kg	☼	113	80 - 120	5	20
Dibromochloromethane	1.1	U	48.3	49.5		ug/Kg	☼	103	80 - 120	1	20
Ethylbenzene	0.60	U	48.3	48.6		ug/Kg	☼	101	80 - 120	1	20
Methylene Chloride	1.4	U	48.3	52.2		ug/Kg	☼	108	77 - 123	3	20
Styrene	1.7	U	48.3	55.2		ug/Kg	☼	114	80 - 120	2	20
Tetrachloroethene	0.49	U	48.3	47.0		ug/Kg	☼	97	80 - 120	0	20
Toluene	2.2	U	48.3	54.2		ug/Kg	☼	112	80 - 124	0	20
trans-1,3-Dichloropropene	1.5	U	48.3	47.5		ug/Kg	☼	98	80 - 122	1	20
Trichloroethene	0.34	U	48.3	55.4		ug/Kg	☼	115	79 - 120	1	20
Vinyl chloride	0.37	U	48.3	38.2		ug/Kg	☼	79	71 - 120	2	20
Xylenes, Total	0.73	U	96.5	108		ug/Kg	☼	112	80 - 120	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*67 - 132*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405431/1-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 15:56	12/15/18 10:44	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32166-1	B3L2L3	95	98	101	103
160-32166-1 MS	B3L2L3	96	101	99	106
160-32166-1 MSD	B3L2L3	92	103	102	103
160-32166-2	B3L2K1	96	106	103	106
160-32166-3	B3L2L9	94	99	99	101
160-32166-4	B3L2P6	95	107	105	106
160-32166-5	B3L2J5	96	103	104	105
160-32166-6	B3L2M8	99	106	108	109
160-32166-7	B3L2P9	97	104	106	105
160-32166-8	B3L2N1	98	101	105	105
160-32166-9	B3L2L0	100	118	108	110
160-32166-10	B3L2R2	101	104	104	107
160-32166-11	B3L2M2	110	121	116	121
160-32166-12	B3L2R5	99	103	105	102
160-32166-13	B3L2M5	109	127	104	115
160-32166-14	B3L2K7	104	113	105	110
160-32166-15	B3L2T4	102	102	102	104
160-32166-16	B3L2J8	104	108	101	107
160-32166-17	B3L2R8	110	137	116	121
160-32166-18	B3L2V1	105	99	108	106

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406531/5	Lab Control Sample	98	101	102	106
LCSD 160-406531/6	Lab Control Sample Dup	93	102	101	106
MB 160-406531/8	Method Blank	95	103	103	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32166-1	B3L2L3	72	76	74	61	70	81

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-407594/8
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/27/18 09:09	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/27/18 09:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/27/18 09:09	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/27/18 09:09	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/27/18 09:09	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/27/18 09:09	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/27/18 09:09	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/27/18 09:09	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/27/18 09:09	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/27/18 09:09	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/27/18 09:09	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/27/18 09:09	1
Acetone	6.5	U	20	6.5	ug/Kg			12/27/18 09:09	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/27/18 09:09	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/27/18 09:09	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/27/18 09:09	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/27/18 09:09	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/27/18 09:09	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/27/18 09:09	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/27/18 09:09	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/27/18 09:09	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/27/18 09:09	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/27/18 09:09	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/27/18 09:09	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/27/18 09:09	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/27/18 09:09	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/27/18 09:09	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/27/18 09:09	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/27/18 09:09	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/27/18 09:09	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/27/18 09:09	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/27/18 09:09	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/27/18 09:09	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/27/18 09:09	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/27/18 09:09*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*67 - 132*		*12/27/18 09:09*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*		*12/27/18 09:09*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 143*		*12/27/18 09:09*	*1*
Toluene-d8 (Surr)	*104*		*74 - 135*		*12/27/18 09:09*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407594/5
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	50.9		ug/Kg		102	71 - 127
1,1,2,2-Tetrachloroethane	50.0	50.9		ug/Kg		102	52 - 140
1,1,2-Trichloroethane	50.0	51.5		ug/Kg		103	79 - 122
1,1-Dichloroethane	50.0	49.0		ug/Kg		98	80 - 120
1,1-Dichloroethene	50.0	50.5		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	50.6		ug/Kg		101	68 - 128
1,2-Dichloroethene, Total	100	101		ug/Kg		101	79 - 121
1,2-Dichloropropane	50.0	50.3		ug/Kg		101	80 - 126
2-Butanone (MEK)	50.0	50.9		ug/Kg		102	41 - 140
2-Hexanone	50.0	48.9		ug/Kg		98	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	47.7		ug/Kg		95	67 - 130
Acetone	50.0	49.5		ug/Kg		99	39 - 140
Benzene	50.0	49.3		ug/Kg		99	80 - 120
Bromodichloromethane	50.0	51.3		ug/Kg		103	78 - 124
Bromoform	50.0	51.6		ug/Kg		103	67 - 135
Bromomethane	50.0	46.0		ug/Kg		92	61 - 132
Carbon disulfide	50.0	48.9		ug/Kg		98	74 - 124
Carbon tetrachloride	50.0	50.5		ug/Kg		101	68 - 130
Chlorobenzene	50.0	50.1		ug/Kg		100	80 - 120
Chloroethane	50.0	43.2		ug/Kg		86	73 - 129
Chloroform	50.0	49.0		ug/Kg		98	78 - 120
Chloromethane	50.0	41.2		ug/Kg		82	69 - 123
cis-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	78 - 127
Dibromochloromethane	50.0	53.4		ug/Kg		107	77 - 126
Ethylbenzene	50.0	50.9		ug/Kg		102	79 - 126
Methylene Chloride	50.0	49.8		ug/Kg		100	76 - 120
Styrene	50.0	53.3		ug/Kg		107	80 - 129
Tetrachloroethene	50.0	50.9		ug/Kg		102	76 - 126
Toluene	50.0	52.1		ug/Kg		104	76 - 136
trans-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	77 - 136
Trichloroethene	50.0	48.3		ug/Kg		97	66 - 130
Vinyl chloride	50.0	46.8		ug/Kg		94	56 - 134
Xylenes, Total	100	109		ug/Kg		109	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-407594/6
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.8		ug/Kg		104	71 - 127	2	20
1,1,2,2-Tetrachloroethane	50.0	50.5		ug/Kg		101	52 - 140	1	20
1,1,2-Trichloroethane	50.0	50.4		ug/Kg		101	79 - 122	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407594/6
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	49.0		ug/Kg		98	80 - 120	0	20
1,1-Dichloroethene	50.0	50.2		ug/Kg		100	71 - 126	0	20
1,2-Dichloroethane	50.0	49.2		ug/Kg		98	68 - 128	3	20
1,2-Dichloroethene, Total	100	101		ug/Kg		101	79 - 121	0	20
1,2-Dichloropropane	50.0	49.9		ug/Kg		100	80 - 126	1	20
2-Butanone (MEK)	50.0	48.5		ug/Kg		97	41 - 140	5	20
2-Hexanone	50.0	47.8		ug/Kg		96	63 - 136	2	20
4-Methyl-2-pentanone (MIBK)	50.0	46.7		ug/Kg		93	67 - 130	2	20
Acetone	50.0	45.4		ug/Kg		91	39 - 140	9	20
Benzene	50.0	49.6		ug/Kg		99	80 - 120	1	20
Bromodichloromethane	50.0	50.9		ug/Kg		102	78 - 124	1	20
Bromoform	50.0	52.3		ug/Kg		105	67 - 135	1	20
Bromomethane	50.0	45.7		ug/Kg		91	61 - 132	1	20
Carbon disulfide	50.0	49.3		ug/Kg		99	74 - 124	1	20
Carbon tetrachloride	50.0	50.8		ug/Kg		102	68 - 130	0	20
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120	3	20
Chloroethane	50.0	42.5		ug/Kg		85	73 - 129	2	20
Chloroform	50.0	49.5		ug/Kg		99	78 - 120	1	20
Chloromethane	50.0	40.7		ug/Kg		81	69 - 123	1	20
cis-1,3-Dichloropropene	50.0	53.3		ug/Kg		107	78 - 127	3	20
Dibromochloromethane	50.0	53.4		ug/Kg		107	77 - 126	0	20
Ethylbenzene	50.0	51.8		ug/Kg		104	79 - 126	2	20
Methylene Chloride	50.0	49.4		ug/Kg		99	76 - 120	1	20
Styrene	50.0	53.9		ug/Kg		108	80 - 129	1	20
Tetrachloroethene	50.0	51.0		ug/Kg		102	76 - 126	0	20
Toluene	50.0	53.5		ug/Kg		107	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	55.0		ug/Kg		110	77 - 136	0	20
Trichloroethene	50.0	48.5		ug/Kg		97	66 - 130	0	20
Vinyl chloride	50.0	47.3		ug/Kg		95	56 - 134	1	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32196-13 MS
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2L6
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.52	U Z	66.6	72.3		ug/Kg	☼	108	80 - 120
1,1,2,2-Tetrachloroethane	2.3	U Z	66.6	63.1		ug/Kg	☼	95	78 - 120
1,1,2-Trichloroethane	1.4	U Z	66.6	67.1		ug/Kg	☼	101	80 - 120
1,1-Dichloroethane	0.47	U Z	66.6	67.5		ug/Kg	☼	101	80 - 120
1,1-Dichloroethene	1.9	U Z	66.6	66.9		ug/Kg	☼	100	78 - 121
1,2-Dichloroethane	1.0	U Z	66.6	69.1		ug/Kg	☼	104	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32196-13 MS
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2L6
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.6	U Z	133	136		ug/Kg	☼	102	80 - 120
1,2-Dichloropropane	0.72	U Z	66.6	66.9		ug/Kg	☼	100	80 - 120
2-Butanone (MEK)	2.3	U Z	66.6	62.7		ug/Kg	☼	94	69 - 124
2-Hexanone	4.0	U Z	66.6	61.4		ug/Kg	☼	92	62 - 118
4-Methyl-2-pentanone (MIBK)	3.1	U Z	66.6	60.0		ug/Kg	☼	90	73 - 125
Acetone	7.8	U Z	66.6	64.4		ug/Kg	☼	97	54 - 139
Benzene	0.31	U Z	66.6	67.3		ug/Kg	☼	101	80 - 120
Bromodichloromethane	0.60	U Z	66.6	70.3		ug/Kg	☼	106	80 - 120
Bromoform	2.3	U Z	66.6	70.8		ug/Kg	☼	106	80 - 125
Bromomethane	2.8	U Z	66.6	61.8		ug/Kg	☼	93	70 - 126
Carbon disulfide	0.83	U Z	66.6	64.2		ug/Kg	☼	96	79 - 121
Carbon tetrachloride	0.61	U Z	66.6	69.7		ug/Kg	☼	105	80 - 120
Chlorobenzene	0.98	U Z	66.6	67.3		ug/Kg	☼	101	80 - 120
Chloroethane	2.4	U Z	66.6	59.9		ug/Kg	☼	90	64 - 133
Chloroform	0.46	U Z	66.6	66.9		ug/Kg	☼	100	80 - 120
Chloromethane	0.78	U Z	66.6	53.6		ug/Kg	☼	80	75 - 120
cis-1,3-Dichloropropene	2.5	U Z	66.6	72.2		ug/Kg	☼	108	80 - 120
Dibromochloromethane	1.5	U Z	66.6	71.7		ug/Kg	☼	108	80 - 120
Ethylbenzene	0.83	U Z	66.6	68.5		ug/Kg	☼	103	80 - 120
Methylene Chloride	1.9	U Z	66.6	66.7		ug/Kg	☼	100	77 - 123
Styrene	2.4	U Z	66.6	70.1		ug/Kg	☼	105	80 - 120
Tetrachloroethene	0.68	U Z	66.6	63.5		ug/Kg	☼	95	80 - 120
Toluene	3.0	U Z	66.6	70.1		ug/Kg	☼	105	80 - 124
trans-1,3-Dichloropropene	2.1	U Z	66.6	72.3		ug/Kg	☼	109	80 - 122
Trichloroethene	0.47	U Z	66.6	70.5		ug/Kg	☼	106	79 - 120
Vinyl chloride	0.52	U Z	66.6	59.6		ug/Kg	☼	89	71 - 120
Xylenes, Total	1.0	U Z	133	144		ug/Kg	☼	108	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*103*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Lab Sample ID: 160-32196-13 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2L6
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.52	U Z	67.8	73.5		ug/Kg	☼	108	80 - 120	2	20
1,1,2,2-Tetrachloroethane	2.3	U Z	67.8	67.5		ug/Kg	☼	99	78 - 120	7	20
1,1,2-Trichloroethane	1.4	U Z	67.8	70.3		ug/Kg	☼	104	80 - 120	5	20
1,1-Dichloroethane	0.47	U Z	67.8	69.5		ug/Kg	☼	102	80 - 120	3	20
1,1-Dichloroethene	1.9	U Z	67.8	68.1		ug/Kg	☼	100	78 - 121	2	20
1,2-Dichloroethane	1.0	U Z	67.8	70.7		ug/Kg	☼	104	78 - 117	2	20
1,2-Dichloroethene, Total	1.6	U Z	136	140		ug/Kg	☼	103	80 - 120	3	20
1,2-Dichloropropane	0.72	U Z	67.8	69.5		ug/Kg	☼	103	80 - 120	4	20
2-Butanone (MEK)	2.3	U Z	67.8	66.4		ug/Kg	☼	98	69 - 124	6	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32196-13 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2L6
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.0	U Z	67.8	67.4		ug/Kg	☼	99	62 - 118	9	20
4-Methyl-2-pentanone (MIBK)	3.1	U Z	67.8	64.1		ug/Kg	☼	94	73 - 125	7	20
Acetone	7.8	U Z	67.8	67.2		ug/Kg	☼	99	54 - 139	4	20
Benzene	0.31	U Z	67.8	68.6		ug/Kg	☼	101	80 - 120	2	20
Bromodichloromethane	0.60	U Z	67.8	72.6		ug/Kg	☼	107	80 - 120	3	20
Bromoform	2.3	U Z	67.8	76.3		ug/Kg	☼	112	80 - 125	7	20
Bromomethane	2.8	U Z	67.8	63.7		ug/Kg	☼	94	70 - 126	3	20
Carbon disulfide	0.83	U Z	67.8	67.6		ug/Kg	☼	100	79 - 121	5	20
Carbon tetrachloride	0.61	U Z	67.8	70.4		ug/Kg	☼	104	80 - 120	1	20
Chlorobenzene	0.98	U Z	67.8	70.4		ug/Kg	☼	104	80 - 120	4	20
Chloroethane	2.4	U Z	67.8	62.3		ug/Kg	☼	92	64 - 133	4	20
Chloroform	0.46	U Z	67.8	69.3		ug/Kg	☼	102	80 - 120	4	20
Chloromethane	0.78	U Z	67.8	56.6		ug/Kg	☼	83	75 - 120	6	20
cis-1,3-Dichloropropene	2.5	U Z	67.8	74.5		ug/Kg	☼	110	80 - 120	3	20
Dibromochloromethane	1.5	U Z	67.8	75.2		ug/Kg	☼	111	80 - 120	5	20
Ethylbenzene	0.83	U Z	67.8	69.7		ug/Kg	☼	103	80 - 120	2	20
Methylene Chloride	1.9	U Z	67.8	69.6		ug/Kg	☼	103	77 - 123	4	20
Styrene	2.4	U Z	67.8	73.2		ug/Kg	☼	108	80 - 120	4	20
Tetrachloroethene	0.68	U Z	67.8	68.3		ug/Kg	☼	101	80 - 120	7	20
Toluene	3.0	U Z	67.8	72.4		ug/Kg	☼	107	80 - 124	3	20
trans-1,3-Dichloropropene	2.1	U Z	67.8	76.1		ug/Kg	☼	112	80 - 122	5	20
Trichloroethene	0.47	U Z	67.8	74.0		ug/Kg	☼	109	79 - 120	5	20
Vinyl chloride	0.52	U Z	67.8	63.6		ug/Kg	☼	94	71 - 120	6	20
Xylenes, Total	1.0	U Z	136	151		ug/Kg	☼	111	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*107*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32196-8	B3L2K4	120	110	114	108
160-32196-9	B3L2N7	120	107	105	103
160-32196-10	B3L2P3	122	102	108	105
160-32196-11	B3L2T1	120	104	110	105
160-32196-12	B3L2N4	126	113	115	107
160-32196-13	B3L2L6	109	106	106	105
160-32196-13 MS	B3L2L6	106	104	103	105
160-32196-13 MSD	B3L2L6	107	106	106	107
160-32196-14	B3L2P0	123	102	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-407594/5	Lab Control Sample	102	98	102	102
LCSD 160-407594/6	Lab Control Sample Dup	98	100	101	104
MB 160-407594/8	Method Blank	105	99	103	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32196-8	B3L2K4	79	81	82	66	77	84
160-32196-8 MS	B3L2K4	80	80	79	74	76	85
160-32196-8 MSD	B3L2K4	81	78	79	71	74	90
160-32196-9	B3L2N7	82	77	76	63	71	80
160-32196-10	B3L2P3	77	78	75	64	68	83
160-32196-11	B3L2T1	74	80	77	66	73	84
160-32196-12 - DL	B3L2N4	0 X	0 X	0 X	0 X	0 X	0 X
160-32196-13 - DL	B3L2L6	0 X	0 X	0 X	0 X	0 X	0 X
160-32196-14	B3L2P0	74	78	79	62	71	80

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL32166-1, SL32196-1, GEL466373, GEL466526

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32166-1 and SL32196-1 prepared by TestAmerica Laboratories Inc and SDGs GEL466373 and GEL466526 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2L3	12/05/18	Soil	C	8270D
B3L2K1	12/05/18	Soil	C	8270D
B3L2L9	12/05/18	Soil	C	8270D
B3L2P6	12/05/18	Soil	C	8270D
B3L2J5	12/05/18	Soil	C	8270D
B3L2M8	12/05/18	Soil	C	8270D
B3L2P9	12/05/18	Soil	C	8270D
B3L2N1	12/05/18	Soil	C	8270D
B3L2L0	12/05/18	Soil	C	8270D
B3L2R2	12/05/18	Soil	C	8270D
B3L2M2	12/05/18	Soil	C	8270D
B3L2R5	12/05/18	Soil	C	8270D
B3L2M5	12/05/18	Soil	C	8270D
B3L2K7	12/05/18	Soil	C	8270D
B3L2T4	12/05/18	Soil	C	8270D
B3L2J8	12/05/18	Soil	C	8270D
B3L2R8	12/05/18	Soil	C	8270D
B3L2V1	12/05/18	Soil	C	8270D
B3L2K4	12/06/18	Soil	C	8270D
B3L2N7	12/06/18	Soil	C	8270D
B3L2P3	12/06/18	Soil	C	8270D
B3L2T1	12/06/18	Soil	C	8270D
B3L2N4	12/06/18	Soil	C	8270D
B3L2L6	12/06/18	Soil	C	8270D
B3L2P0	12/06/18	Soil	C	8270D
B3MN89	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MNB4	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN91	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN93	12/05/18	Soil	C	WTPH-D, WTPH-G

B3MN92	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN87	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN82	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MNB0	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN86	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN98	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN81	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN90	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MNB1	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN83	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN99	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MNB2	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN85	12/05/18	Soil	C	WTPH-D, WTPH-G
B3MN84	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN88	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN94	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN95	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN96	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN97	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MNB3	12/06/18	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for WTPH-G requires analysis within 14 days of sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

SDG SL32166-1
The nitrobenzene-d5 surrogate recoveries for samples B3L2L3, B3L2K1, B3L2L9, B3L2P6, B3L2M8, B3L2N1, B3L2R2, B3L2M5 and the MB were below the lower acceptance limit but ≥20%. In addition, the 2,4,6-tribromophenol and nitrobenzene recoveries for sample B3L2T4 were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and other associated surrogate recoveries were within the acceptance limit; therefore data should not be qualified.

The 2,4,6-tribromophenol, 2-fluorobiphenyl, 2-fluorophenol, nitrobenzene-d5 and phenol-d5 surrogate recoveries for sample B3L2J8 were below the lower acceptance limit but ≥20%. All associated sample results should be qualified as estimates and flagged "UJ" for non-detects and flagged "J-" for detects.

All surrogate recoveries for samples B3L2J5, B3L2P9, B3L2L0, B3L2M2, B3L2R5 and B3L2K7 were <20%. All samples were analyzed at dilutions and based on professional judgment data should not be qualified as a result.

SDG SL32196-1
The nitrobenzene-d5 surrogate recoveries for samples B3L2K4, B3L2N7, B3L2T1, B3L2P0 and the MB were below the lower acceptance limit but ≥20%. In addition the nitrobenzene-d5 and phenol-d5 surrogate recoveries for sample B3L2P3 were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and all other associated surrogate recoveries were within the acceptance limit; therefore data should not be qualified.

All surrogate recoveries for samples B3L2N4 and B3L2L6 were <20%. The samples were analyzed at dilutions and based on professional judgment; data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32166-1, the MS and/or MSD recoveries for 1,3-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane and isophorone were below the lower acceptance limit but ≥20%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ". See the table in Appendix 2 for a listing of affected samples.

For SDG SL32196-1, the MS and/or MSD recoveries for 1,2-dichlorobenzene, 1,3-dinitrobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane, isophorone and pentachlorophenol were below the lower acceptance limit but ≥20%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32166-1, the LCS recoveries for 4-chloroaniline and isophorone were below the lower acceptance limit but ≥ 40%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected sample.

For SDG SL32196-1, the LCS recoveries for 4-choroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects for these analytes and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

CRDLs for WTPH-D and WTPH-G were met.

- **Completeness**

SDGs SL32166-1, SL32196-1, GEL466373 and GEL466526 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recoveries, low matrix spike and low LCS recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL32166-1, SL32196-1, GEL466373, GEL466526	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
All SVOC analytes **except** 1,3-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, bis(2-ethylhexyl)phthalate hexachlorocyclopentadiene, hexachloroethane, isophorone	UJ	B3L2J8	Low surrogate recoveries
bis(2-ethylhexyl)phthalate	J-	B3L2J8	Low surrogate recoveries
1,3-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane	UJ	B3L2J8	Low surrogate recoveries and low matrix spike recoveries
4-chloroaniline, isophorone	UJ	B3L2J8	Low surrogate recoveries, low matrix spike recoveries and low LCS recoveries
1,3-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane	UJ	B3L2L3, B3L2K1, B3L2L9. B3L2P6, B3L2J5, B3L2M8, B3L2P9, B3L2N1, B3L2L0, B3L2R2, B3L2M2, B3L2R5, B3L2M5, B3L2K7, B3L2T4, B3L2R8, B3L2V1	Low matrix spike recoveries
4-chloroaniline, isophorone	UJ	B3L2L3, B3L2K1, B3L2L9. B3L2P6, B3L2J5, B3L2M8, B3L2P9, B3L2N1,	Low matrix spike recoveries and low LCS recoveries

		B3L2L0, B3L2R2, B3L2M2, B3L2R5, B3L2M5, B3L2K7, B3L2T4, B3L2R8, B3L2V1	
1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol 3,3'-dichlorobenzidine, benzo(g,h,i)perylene, hexachlorocyclopentadiene, hexachloroethane, pentachlorophenol	UJ	B3L2K4, B3L2N7, B3L2P3, B3L2T1, B3L2P0, B3L2N4, B3L2L6,	Low matrix spike recoveries
4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, isophorone	UJ	B3L2K4, B3L2N7, B3L2P3, B3L2T1, B3L2P0, B3L2N4, B3L2L6	Low matrix spike recoveries and low LCS recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/23/19	
			SDG: SL32166-1, SL32196-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SL32166-1: B3L2L3, B3L2K1, B3L2L9, B3L2P6, B3L2J5, B3L2M8, B3L2P9, B3L2N1, B3L2L0, B3L2R2, B3L2M2, B3L2R5, B3L2M5, B3L2K7, B3L2T4, B3L2J8, B3L2R8, B3L2V1,					
SL32196-1: B3L2K4, B3L2N7, B3L2P3, B3L2T1, B3L2N4, B3L2L6, B3L2P0,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SL32166-1: B3L2L3 NBZ 61%; B3L2K1 NBZ 64%; B3L2L9 NBZ 67%, B3L2P6 NBZ 65%; B3L2M8 NBZ 64%, B3L2N1 NBZ 68%, B3L2R2 NBZ 68%, B3L2M5 NBZ 66%, B3L2T4 TBP 69%, NBZ 62%; B3L2J8 TBP 68%, FBP 69%, 2FP 67%, NBZ 55%, PHL 63%; MB NBZ 69%
B3L2J5, B3L2P9, B3L2L0, B3L2M2, B3L2R5, B3L2K7 all 0%

SL32196-1: B3L2K4 NBZ 66%, B3L2N7 NBZ 63%, B3L2P3 NBZ 64%, PHL 68%; B3L2T1 NBZ 66%; B3L2P0 NBZ 62%, MB NBZ 67%
B3L2N4, B3L2L6 all 0%

See last page for MS/MSD and LCS information

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

MS/MSD

SL32166-1: 1,3-dichlorobenzene 69%(MSD); 2,4-dinitrophenol 63%/69%; 3,3'-dichlorobenzidine 68%/69%, 4-chloroaniline 65%/65%; bis(2 chloro-1-methylethyl)ether 66% (MSD), bis(2-chloroethyl)ether 64% (MSD) hexachlorocyclopentadiene 69% (MS); hexachloroethane 68% (MSD); isophorone 69%/64%;

SL32196-1: 1,2-dichlorobenzene 67%/66%; 1,3-dichlorobenzene 64%/62%; 1,4-dichlorobenzene 67%/64%; 2,4-dinitrophenol 64%/57%; 3,3'-dichlorobenzidine 61%/64%; 4-chloroaniline 62%/62%; benzo(g,h,i,)perylene 66% (MSD); bis(2 chloro-1-methyethyl)ether 66%/64%; bis(2-chloroethyl)ether 64%/64%; hexachlorocyclopentadiene 60%/58%; hexachloroethane 64%/61%; isophorone 67%/65%; pentachlorophenol 68% (MS)

LCS

SL32166-1: 4-chloroaniline 69%; isophorone 69%

SL32196-1: 4-chloroaniline 64%; bis(2 chloro-1-methylethyl)ether 69%; bis(2-chloroethyl)ether 66%; isophorone 68%

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/23/19	
			SDG: GEL466373, GEL466526		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	
SAMPLES/MATRIX: Soil					
GEL466373: B3MN89, B3MNB4, B3MN91, B3MN93, B3MN92, B3MN87, B3MN82, B3MNB0, B3MN86, B3MN98, B3MN81, B3MN90, B3MNB1, B3MN83, B3MN99, B3MNB2, B3MN85					
GEL466526: B3MN84, B3MN88, B3MN94, B3MN95, B3MN96, B3MN97, B3MNB3					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	2.9	U	48.3	38.9		ug/Kg	☼	81	62 - 118	0	20
4-Methyl-2-pentanone (MIBK)	2.2	U	48.3	39.7		ug/Kg	☼	82	73 - 125	3	20
Acetone	5.6	U	48.3	44.2		ug/Kg	☼	92	54 - 139	8	20
Benzene	0.22	U	48.3	51.6		ug/Kg	☼	107	80 - 120	5	20
Bromodichloromethane	0.43	U	48.3	49.7		ug/Kg	☼	103	80 - 120	2	20
Bromoform	1.7	U	48.3	49.2		ug/Kg	☼	102	80 - 125	0	20
Bromomethane	2.0	U	48.3	39.9		ug/Kg	☼	83	70 - 126	1	20
Carbon disulfide	0.60	U	48.3	48.1		ug/Kg	☼	100	79 - 121	5	20
Carbon tetrachloride	0.44	U	48.3	45.7		ug/Kg	☼	95	80 - 120	3	20
Chlorobenzene	0.70	U	48.3	50.3		ug/Kg	☼	104	80 - 120	2	20
Chloroethane	1.7	U o	48.3	33.2		ug/Kg	☼	69	64 - 133	1	20
Chloroform	0.33	U	48.3	47.2		ug/Kg	☼	98	80 - 120	5	20
Chloromethane	0.56	U	48.3	41.9		ug/Kg	☼	87	75 - 120	1	20
cis-1,3-Dichloropropene	1.8	U	48.3	54.4		ug/Kg	☼	113	80 - 120	5	20
Dibromochloromethane	1.1	U	48.3	49.5		ug/Kg	☼	103	80 - 120	1	20
Ethylbenzene	0.60	U	48.3	48.6		ug/Kg	☼	101	80 - 120	1	20
Methylene Chloride	1.4	U	48.3	52.2		ug/Kg	☼	108	77 - 123	3	20
Styrene	1.7	U	48.3	55.2		ug/Kg	☼	114	80 - 120	2	20
Tetrachloroethene	0.49	U	48.3	47.0		ug/Kg	☼	97	80 - 120	0	20
Toluene	2.2	U	48.3	54.2		ug/Kg	☼	112	80 - 124	0	20
trans-1,3-Dichloropropene	1.5	U	48.3	47.5		ug/Kg	☼	98	80 - 122	1	20
Trichloroethene	0.34	U	48.3	55.4		ug/Kg	☼	115	79 - 120	1	20
Vinyl chloride	0.37	U	48.3	38.2		ug/Kg	☼	79	71 - 120	2	20
Xylenes, Total	0.73	U	96.5	108		ug/Kg	☼	112	80 - 120	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*67 - 132*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*103*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405431/1-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 15:56	12/15/18 10:44	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405431/1-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Methylphenol	42	U	330	42	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
2-Picoline	45	U	660	45	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Acenaphthene	35	U	330	35	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Acenaphthylene	46	U	330	46	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Acetophenone	34	U	330	34	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Aniline	60	U	330	60	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Anthracene	49	U	330	49	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Aramite	330	U	660	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405431/1-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Carbazole	47	U	330	47	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Chrysene	46	U	330	46	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Diallate	67	U	660	67	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Dibenzofuran	41	U	330	41	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Diethylphthalate	82	U	330	82	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Dimethoate	100	U	660	100	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Dinoseb	330	U	660	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Disulfoton	41	U	1600	41	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Famphur	33	U	3300	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Fluoranthene	50	U	330	50	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Fluorene	46	U	330	46	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachloroethane	35	U	330	35	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Isodrin	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Isophorone	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Isosafrole	67	U	660	67	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Kepone	330	U	3300	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Methapyrilene	140	U	1600	140	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Methyl parathion	120	U	1600	120	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Naphthalene	35	U	330	35	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Nitrobenzene	40	U	330	40	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405431/1-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Parathion	98	U	1600	98	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Phenacetin	54	U	660	54	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Phenanthrene	42	U	330	42	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Phenol	38	U	330	38	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Phorate	37	U	1600	37	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pronamide	53	U	660	53	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pyrene	73	U	330	73	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Pyridine	71	U	660	71	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Safrole	33	U	660	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/12/18 15:56	12/15/18 10:44	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/12/18 15:56	12/15/18 10:44	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*363*	*N J*	*ug/Kg*		*4.25*	*141-79-7*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
Unknown	*14000*	*N*	*ug/Kg*		*4.59*		*12/12/18 15:56*	*12/15/18 10:44*	*1*
Unknown	*454*	*N*	*ug/Kg*		*5.14*		*12/12/18 15:56*	*12/15/18 10:44*	*1*
n-Hexadecanoic acid	*491*	*N J*	*ug/Kg*		*10.97*	*57-10-3*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
Unknown	*273*	*N*	*ug/Kg*		*13.85*		*12/12/18 15:56*	*12/15/18 10:44*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
2-Fluorophenol (Surr)	*90*		*54 - 102*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
Nitrobenzene-d5 (Surr)	*69*		*44 - 120*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
Phenol-d5 (Surr)	*82*		*51 - 104*	*12/12/18 15:56*	*12/15/18 10:44*	*1*
Terphenyl-d14 (Surr)	*91*		*59 - 98*	*12/12/18 15:56*	*12/15/18 10:44*	*1*

Lab Sample ID: LCS 160-405431/2-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2650		ug/Kg		79	58 - 101
1,2-Dichlorobenzene	3330	2610		ug/Kg		78	57 - 99
1,3-Dichlorobenzene	3330	2500		ug/Kg		75	55 - 98
1,4-Dichlorobenzene	3330	2660		ug/Kg		80	56 - 98
2,4,5-Trichlorophenol	3330	2850		ug/Kg		85	56 - 109
2,4,6-Trichlorophenol	3330	2920		ug/Kg		87	56 - 110
2,4-Dichlorophenol	3330	2960		ug/Kg		89	57 - 99

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405431/2-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dimethylphenol	3330	2860		ug/Kg		86	53 - 97
2,4-Dinitrophenol	3330	2450		ug/Kg		73	10 - 89
2,4-Dinitrotoluene	3330	2860		ug/Kg		86	54 - 105
2,6-Dinitrotoluene	3330	2880		ug/Kg		86	55 - 105
2-Chloronaphthalene	3330	2840		ug/Kg		85	56 - 111
2-Chlorophenol	3330	2830		ug/Kg		85	56 - 99
2-Methylnaphthalene	3330	2870		ug/Kg		86	58 - 98
2-Methylphenol	3330	2780		ug/Kg		83	53 - 97
2-Nitroaniline	3330	2690		ug/Kg		81	55 - 108
2-Nitrophenol	3330	2750		ug/Kg		82	59 - 104
3 & 4 Methylphenol	3330	3220		ug/Kg		97	58 - 108
3,3'-Dichlorobenzidine	3330	2500		ug/Kg		75	42 - 104
3-Nitroaniline	3330	2620		ug/Kg		79	43 - 96
4,6-Dinitro-2-methylphenol	3330	2930		ug/Kg		88	19 - 102
4-Bromophenyl phenyl ether	3330	2910		ug/Kg		87	58 - 109
4-Chloro-3-methylphenol	3330	2900		ug/Kg		87	54 - 98
4-Chloroaniline	3330	2290		ug/Kg		69	41 - 83
4-Chlorophenyl phenyl ether	3330	2880		ug/Kg		86	55 - 105
4-Nitroaniline	3330	2830		ug/Kg		85	49 - 99
4-Nitrophenol	3330	2810		ug/Kg		84	48 - 106
Acenaphthene	3330	2870		ug/Kg		86	55 - 106
Acenaphthylene	3330	2840		ug/Kg		85	56 - 109
Anthracene	3330	2950		ug/Kg		89	56 - 103
Benzo[a]anthracene	3330	3000		ug/Kg		90	56 - 107
Benzo[a]pyrene	3330	2830		ug/Kg		85	57 - 109
Benzo[b]fluoranthene	3330	2820		ug/Kg		85	68 - 109
Benzo[g,h,i]perylene	3330	3380		ug/Kg		101	51 - 126
Benzo[k]fluoranthene	3330	2710		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2450		ug/Kg		73	49 - 94
Bis(2-chloroethoxy)methane	3330	2570		ug/Kg		77	56 - 99
Bis(2-chloroethyl)ether	3330	2360		ug/Kg		71	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3100		ug/Kg		93	59 - 113
Butyl benzyl phthalate	3330	3000		ug/Kg		90	60 - 112
Carbazole	3330	3040		ug/Kg		91	53 - 98
Chrysene	3330	2930		ug/Kg		88	54 - 107
Dibenz(a,h)anthracene	3330	3300		ug/Kg		99	52 - 126
Dibenzofuran	3330	2860		ug/Kg		86	55 - 103
Diethylphthalate	3330	2960		ug/Kg		89	54 - 101
Di-n-butyl phthalate	3330	3090		ug/Kg		93	57 - 102
Di-n-octyl phthalate	3330	3270		ug/Kg		98	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3530		ug/Kg		106	63 - 121
Fluoranthene	3330	3130		ug/Kg		94	54 - 100
Fluorene	3330	2970		ug/Kg		89	57 - 106
Hexachlorobenzene	3330	3020		ug/Kg		91	57 - 109
Hexachlorobutadiene	3330	2820		ug/Kg		85	59 - 106
Hexachlorocyclopentadiene	3330	2450		ug/Kg		74	44 - 140
Hexachloroethane	3330	2620		ug/Kg		78	56 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405431/2-A
Matrix: Solid
Analysis Batch: 405932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Indeno[1,2,3-cd]pyrene	3330	3420		ug/Kg		103	52 - 132
Isophorone	3330	2310		ug/Kg		69	55 - 96
Naphthalene	3330	2740		ug/Kg		82	57 - 98
Nitrobenzene	3330	2550		ug/Kg		76	58 - 102
N-Nitrosodi-n-propylamine	3330	2690		ug/Kg		81	54 - 98
Pentachlorophenol	3330	2800		ug/Kg		84	35 - 107
Phenanthrene	3330	2980		ug/Kg		89	57 - 103
Phenol	3330	2630		ug/Kg		79	50 - 96
Pyrene	3330	2930		ug/Kg		88	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*85*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*86*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*79*		*51 - 104*
Terphenyl-d14 (Surr)	*89*		*59 - 98*

Lab Sample ID: 160-32166-1 MS
Matrix: Soil
Analysis Batch: 405932

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	35	U	3500	2580		ug/Kg	☼	74	52 - 103
1,2-Dichlorobenzene	37	U	3500	2610		ug/Kg	☼	74	50 - 98
1,3-Dichlorobenzene	39	U	3500	2560		ug/Kg	☼	73	49 - 96
1,4-Dichlorobenzene	40	U	3500	2610		ug/Kg	☼	75	50 - 96
2,4,5-Trichlorophenol	55	U	3500	2770		ug/Kg	☼	79	41 - 116
2,4,6-Trichlorophenol	49	U	3500	2820		ug/Kg	☼	80	40 - 115
2,4-Dichlorophenol	41	U	3500	2920		ug/Kg	☼	83	47 - 104
2,4-Dimethylphenol	59	U	3500	2830		ug/Kg	☼	81	45 - 105
2,4-Dinitrophenol	350	U	3500	2200		ug/Kg	☼	63	10 - 100
2,4-Dinitrotoluene	130	U	3500	2750		ug/Kg	☼	78	42 - 113
2,6-Dinitrotoluene	66	U	3500	2780		ug/Kg	☼	80	46 - 109
2-Chloronaphthalene	40	U	3500	2720		ug/Kg	☼	78	52 - 108
2-Chlorophenol	40	U	3500	2890		ug/Kg	☼	82	48 - 102
2-Methylnaphthalene	42	U	3500	2780		ug/Kg	☼	79	55 - 97
2-Methylphenol	45	U	3500	2790		ug/Kg	☼	80	46 - 98
2-Nitroaniline	130	U	3500	2740		ug/Kg	☼	78	45 - 111
2-Nitrophenol	150	U	3500	2780		ug/Kg	☼	79	38 - 115
3 & 4 Methylphenol	70	U	3500	3340		ug/Kg	☼	95	48 - 111
3,3'-Dichlorobenzidine	120	U	3500	2400		ug/Kg	☼	68	23 - 102
3-Nitroaniline	110	U	3500	2550		ug/Kg	☼	73	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3500	2750		ug/Kg	☼	78	15 - 118
4-Bromophenyl phenyl ether	52	U	3500	2870		ug/Kg	☼	82	53 - 110
4-Chloro-3-methylphenol	45	U	3500	2860		ug/Kg	☼	82	36 - 111
4-Chloroaniline	49	U	3500	2270		ug/Kg	☼	65	32 - 79
4-Chlorophenyl phenyl ether	46	U	3500	2740		ug/Kg	☼	78	51 - 103

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32166-1 MS
Matrix: Soil
Analysis Batch: 405932

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitroaniline	79	U	3500	2880		ug/Kg	☼	82	36 - 102
4-Nitrophenol	350	U	3500	2690		ug/Kg	☼	77	40 - 113
Acenaphthene	37	U	3500	2750		ug/Kg	☼	78	53 - 105
Acenaphthylene	48	U	3500	2780		ug/Kg	☼	79	55 - 107
Anthracene	52	U	3500	2850		ug/Kg	☼	82	55 - 103
Benzo[a]anthracene	63	U	3500	2850		ug/Kg	☼	81	48 - 112
Benzo[a]pyrene	95	U	3500	2810		ug/Kg	☼	80	46 - 117
Benzo[b]fluoranthene	35	U	3500	2770		ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene	35	U	3500	3340		ug/Kg	☼	95	24 - 134
Benzo[k]fluoranthene	85	U	3500	2710		ug/Kg	☼	77	43 - 114
bis(2 chloro-1-methylethyl) ether	44	U	3500	2580		ug/Kg	☼	74	38 - 98
Bis(2-chloroethoxy)methane	40	U	3500	2600		ug/Kg	☼	74	49 - 100
Bis(2-chloroethyl)ether	35	U	3500	2500		ug/Kg	☼	71	49 - 100
Bis(2-ethylhexyl) phthalate	110	J	3500	3110		ug/Kg	☼	86	50 - 113
Butyl benzyl phthalate	98	U	3500	3020		ug/Kg	☼	86	54 - 112
Carbazole	50	U	3500	2960		ug/Kg	☼	85	47 - 102
Chrysene	48	U	3500	2860		ug/Kg	☼	82	45 - 115
Dibenz(a,h)anthracene	70	U	3500	3270		ug/Kg	☼	93	30 - 134
Dibenzofuran	43	U	3500	2750		ug/Kg	☼	79	50 - 102
Diethylphthalate	87	U	3500	2810		ug/Kg	☼	80	46 - 107
Di-n-butyl phthalate	68	U	3500	3050		ug/Kg	☼	87	49 - 107
Di-n-octyl phthalate	140	U	3500	3320		ug/Kg	☼	95	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	35	U	3500	3410		ug/Kg	☼	97	33 - 140
Fluoranthene	53	U	3500	2960		ug/Kg	☼	84	45 - 109
Fluorene	48	U	3500	2840		ug/Kg	☼	81	45 - 109
Hexachlorobenzene	45	U	3500	2850		ug/Kg	☼	82	48 - 113
Hexachlorobutadiene	42	U	3500	2600		ug/Kg	☼	74	48 - 109
Hexachlorocyclopentadiene	350	U	3500	2420		ug/Kg	☼	69	21 - 144
Hexachloroethane	37	U	3500	2590		ug/Kg	☼	74	44 - 102
Indeno[1,2,3-cd]pyrene	67	U	3500	3340		ug/Kg	☼	95	30 - 136
Isophorone	40	U	3500	2410		ug/Kg	☼	69	48 - 100
Naphthalene	37	U	3500	2710		ug/Kg	☼	77	54 - 98
Nitrobenzene	43	U	3500	2680		ug/Kg	☼	76	51 - 106
N-Nitrosodi-n-propylamine	43	U	3500	2720		ug/Kg	☼	78	47 - 104
Pentachlorophenol	350	U	3500	2530		ug/Kg	☼	72	23 - 116
Phenanthrene	45	U	3500	2910		ug/Kg	☼	83	53 - 106
Phenol	40	U	3500	2670		ug/Kg	☼	76	41 - 100
Pyrene	77	U	3500	2890		ug/Kg	☼	82	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*78*		*44 - 120*
Phenol-d5 (Surr)	*79*		*51 - 104*
Terphenyl-d14 (Surr)	*83*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 405932

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	35	U	3480	2530		ug/Kg	☼	73	52 - 103	2	30
1,2-Dichlorobenzene	37	U	3480	2530		ug/Kg	☼	73	50 - 98	3	30
1,3-Dichlorobenzene	39	U	3480	2390		ug/Kg	☼	69	49 - 96	7	30
1,4-Dichlorobenzene	40	U	3480	2490		ug/Kg	☼	72	50 - 96	5	30
2,4,5-Trichlorophenol	55	U	3480	2880		ug/Kg	☼	83	41 - 116	4	30
2,4,6-Trichlorophenol	49	U	3480	2840		ug/Kg	☼	82	40 - 115	1	30
2,4-Dichlorophenol	41	U	3480	2930		ug/Kg	☼	84	47 - 104	0	30
2,4-Dimethylphenol	59	U	3480	2780		ug/Kg	☼	80	45 - 105	2	30
2,4-Dinitrophenol	350	U	3480	2410		ug/Kg	☼	69	10 - 100	9	30
2,4-Dinitrotoluene	130	U	3480	2870		ug/Kg	☼	82	42 - 113	4	30
2,6-Dinitrotoluene	66	U	3480	2920		ug/Kg	☼	84	46 - 109	5	30
2-Chloronaphthalene	40	U	3480	2820		ug/Kg	☼	81	52 - 108	4	30
2-Chlorophenol	40	U	3480	2790		ug/Kg	☼	80	48 - 102	4	30
2-Methylnaphthalene	42	U	3480	2740		ug/Kg	☼	79	55 - 97	1	30
2-Methylphenol	45	U	3480	2730		ug/Kg	☼	79	46 - 98	2	30
2-Nitroaniline	130	U	3480	2640		ug/Kg	☼	76	45 - 111	4	30
2-Nitrophenol	150	U	3480	2680		ug/Kg	☼	77	38 - 115	4	30
3 & 4 Methylphenol	70	U	3480	3170		ug/Kg	☼	91	48 - 111	5	30
3,3'-Dichlorobenzidine	120	U	3480	2400		ug/Kg	☼	69	23 - 102	0	30
3-Nitroaniline	110	U	3480	2660		ug/Kg	☼	76	32 - 95	4	30
4,6-Dinitro-2-methylphenol	350	U	3480	2850		ug/Kg	☼	82	15 - 118	4	30
4-Bromophenyl phenyl ether	52	U	3480	2850		ug/Kg	☼	82	53 - 110	1	30
4-Chloro-3-methylphenol	45	U	3480	2780		ug/Kg	☼	80	36 - 111	3	30
4-Chloroaniline	49	U	3480	2260		ug/Kg	☼	65	32 - 79	0	30
4-Chlorophenyl phenyl ether	46	U	3480	2880		ug/Kg	☼	83	51 - 103	5	30
4-Nitroaniline	79	U	3480	2880		ug/Kg	☼	83	36 - 102	0	30
4-Nitrophenol	350	U	3480	2620		ug/Kg	☼	75	40 - 113	2	30
Acenaphthene	37	U	3480	2820		ug/Kg	☼	81	53 - 105	3	30
Acenaphthylene	48	U	3480	2800		ug/Kg	☼	80	55 - 107	1	30
Anthracene	52	U	3480	2840		ug/Kg	☼	82	55 - 103	0	30
Benzo[a]anthracene	63	U	3480	2940		ug/Kg	☼	84	48 - 112	3	30
Benzo[a]pyrene	95	U	3480	2750		ug/Kg	☼	79	46 - 117	2	30
Benzo[b]fluoranthene	35	U	3480	2760		ug/Kg	☼	79	45 - 125	0	30
Benzo[g,h,i]perylene	35	U	3480	3320		ug/Kg	☼	95	24 - 134	1	30
Benzo[k]fluoranthene	85	U	3480	2680		ug/Kg	☼	77	43 - 114	1	30
bis(2 chloro-1-methylethyl) ether	44	U	3480	2310		ug/Kg	☼	66	38 - 98	11	30
Bis(2-chloroethoxy)methane	40	U	3480	2480		ug/Kg	☼	71	49 - 100	5	30
Bis(2-chloroethyl)ether	35	U	3480	2220		ug/Kg	☼	64	49 - 100	12	30
Bis(2-ethylhexyl) phthalate	110	J	3480	3130		ug/Kg	☼	87	50 - 113	0	30
Butyl benzyl phthalate	98	U	3480	3000		ug/Kg	☼	86	54 - 112	1	30
Carbazole	50	U	3480	2880		ug/Kg	☼	83	47 - 102	3	30
Chrysene	48	U	3480	2860		ug/Kg	☼	82	45 - 115	0	30
Dibenz(a,h)anthracene	70	U	3480	3310		ug/Kg	☼	95	30 - 134	1	30
Dibenzofuran	43	U	3480	2800		ug/Kg	☼	80	50 - 102	2	30
Diethylphthalate	87	U	3480	2910		ug/Kg	☼	84	46 - 107	3	30
Di-n-butyl phthalate	68	U	3480	2960		ug/Kg	☼	85	49 - 107	3	30
Di-n-octyl phthalate	140	U	3480	3170		ug/Kg	☼	91	35 - 125	4	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 405932

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	35	U	3480	3350		ug/Kg	☼	96	33 - 140	2	30
Fluoranthene	53	U	3480	2940		ug/Kg	☼	85	45 - 109	0	30
Fluorene	48	U	3480	2900		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3480	2870		ug/Kg	☼	82	48 - 113	1	30
Hexachlorobutadiene	42	U	3480	2700		ug/Kg	☼	78	48 - 109	4	30
Hexachlorocyclopentadiene	350	U	3480	2470		ug/Kg	☼	71	21 - 144	2	30
Hexachloroethane	37	U	3480	2360		ug/Kg	☼	68	44 - 102	9	30
Indeno[1,2,3-cd]pyrene	67	U	3480	3350		ug/Kg	☼	96	30 - 136	0	30
Isophorone	40	U	3480	2230		ug/Kg	☼	64	48 - 100	8	30
Naphthalene	37	U	3480	2600		ug/Kg	☼	75	54 - 98	4	30
Nitrobenzene	43	U	3480	2570		ug/Kg	☼	74	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3480	2500		ug/Kg	☼	72	47 - 104	9	30
Pentachlorophenol	350	U	3480	2610		ug/Kg	☼	75	23 - 116	3	30
Phenanthrene	45	U	3480	2870		ug/Kg	☼	83	53 - 106	1	30
Phenol	40	U	3480	2550		ug/Kg	☼	73	41 - 100	5	30
Pyrene	77	U	3480	2870		ug/Kg	☼	83	39 - 130	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*75*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32166-1	B3L2L3	95	98	101	103
160-32166-1 MS	B3L2L3	96	101	99	106
160-32166-1 MSD	B3L2L3	92	103	102	103
160-32166-2	B3L2K1	96	106	103	106
160-32166-3	B3L2L9	94	99	99	101
160-32166-4	B3L2P6	95	107	105	106
160-32166-5	B3L2J5	96	103	104	105
160-32166-6	B3L2M8	99	106	108	109
160-32166-7	B3L2P9	97	104	106	105
160-32166-8	B3L2N1	98	101	105	105
160-32166-9	B3L2L0	100	118	108	110
160-32166-10	B3L2R2	101	104	104	107
160-32166-11	B3L2M2	110	121	116	121
160-32166-12	B3L2R5	99	103	105	102
160-32166-13	B3L2M5	109	127	104	115
160-32166-14	B3L2K7	104	113	105	110
160-32166-15	B3L2T4	102	102	102	104
160-32166-16	B3L2J8	104	108	101	107
160-32166-17	B3L2R8	110	137	116	121
160-32166-18	B3L2V1	105	99	108	106

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406531/5	Lab Control Sample	98	101	102	106
LCSD 160-406531/6	Lab Control Sample Dup	93	102	101	106
MB 160-406531/8	Method Blank	95	103	103	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32166-1	B3L2L3	72	76	74	61	70	81

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32166-1 MS	B3L2L3	77	80	82	78	79	83
160-32166-1 MSD	B3L2L3	81	81	79	75	75	85
160-32166-2	B3L2K1	75	80	83	64	78	86
160-32166-3	B3L2L9	79	82	80	67	74	85
160-32166-4	B3L2P6	82	81	81	65	74	83
160-32166-5 - DL	B3L2J5	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-6	B3L2M8	80	80	81	64	75	85
160-32166-7 - DL	B3L2P9	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-8	B3L2N1	84	87	85	68	78	85
160-32166-9 - DL	B3L2L0	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-10	B3L2R2	78	82	81	68	77	86
160-32166-11 - DL	B3L2M2	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-12 - DL	B3L2R5	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-13 - DL	B3L2M5	70	83	83	66	77	86
160-32166-14 - DL	B3L2K7	0 X	0 X	0 X	0 X	0 X	0 X
160-32166-15 - DL	B3L2T4	69	78	80	62	73	95
160-32166-16	B3L2J8	58	69	67	55	63	74
160-32166-17 - DL	B3L2R8	82	82	81	59	79	93

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405431/2-A	Lab Control Sample	85	85	86	79	79	89
MB 160-405431/1-A	Method Blank	80	85	90	69	82	91

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32196-13 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2L6
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.0	U Z	67.8	67.4		ug/Kg	☼	99	62 - 118	9	20
4-Methyl-2-pentanone (MIBK)	3.1	U Z	67.8	64.1		ug/Kg	☼	94	73 - 125	7	20
Acetone	7.8	U Z	67.8	67.2		ug/Kg	☼	99	54 - 139	4	20
Benzene	0.31	U Z	67.8	68.6		ug/Kg	☼	101	80 - 120	2	20
Bromodichloromethane	0.60	U Z	67.8	72.6		ug/Kg	☼	107	80 - 120	3	20
Bromoform	2.3	U Z	67.8	76.3		ug/Kg	☼	112	80 - 125	7	20
Bromomethane	2.8	U Z	67.8	63.7		ug/Kg	☼	94	70 - 126	3	20
Carbon disulfide	0.83	U Z	67.8	67.6		ug/Kg	☼	100	79 - 121	5	20
Carbon tetrachloride	0.61	U Z	67.8	70.4		ug/Kg	☼	104	80 - 120	1	20
Chlorobenzene	0.98	U Z	67.8	70.4		ug/Kg	☼	104	80 - 120	4	20
Chloroethane	2.4	U Z	67.8	62.3		ug/Kg	☼	92	64 - 133	4	20
Chloroform	0.46	U Z	67.8	69.3		ug/Kg	☼	102	80 - 120	4	20
Chloromethane	0.78	U Z	67.8	56.6		ug/Kg	☼	83	75 - 120	6	20
cis-1,3-Dichloropropene	2.5	U Z	67.8	74.5		ug/Kg	☼	110	80 - 120	3	20
Dibromochloromethane	1.5	U Z	67.8	75.2		ug/Kg	☼	111	80 - 120	5	20
Ethylbenzene	0.83	U Z	67.8	69.7		ug/Kg	☼	103	80 - 120	2	20
Methylene Chloride	1.9	U Z	67.8	69.6		ug/Kg	☼	103	77 - 123	4	20
Styrene	2.4	U Z	67.8	73.2		ug/Kg	☼	108	80 - 120	4	20
Tetrachloroethene	0.68	U Z	67.8	68.3		ug/Kg	☼	101	80 - 120	7	20
Toluene	3.0	U Z	67.8	72.4		ug/Kg	☼	107	80 - 124	3	20
trans-1,3-Dichloropropene	2.1	U Z	67.8	76.1		ug/Kg	☼	112	80 - 122	5	20
Trichloroethene	0.47	U Z	67.8	74.0		ug/Kg	☼	109	79 - 120	5	20
Vinyl chloride	0.52	U Z	67.8	63.6		ug/Kg	☼	94	71 - 120	6	20
Xylenes, Total	1.0	U Z	136	151		ug/Kg	☼	111	80 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*67 - 132*
4-Bromofluorobenzene (Surr)	*106*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*107*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Picoline	45	U	660	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthylene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acetophenone	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aniline	60	U	330	60	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Anthracene	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aramite	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Carbazole	47	U	330	47	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chrysene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diallate	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenzofuran	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diethylphthalate	82	U	330	82	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethoate	100	U	660	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dinoseb	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Disulfoton	41	U	1600	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Famphur	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluoranthene	50	U	330	50	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluorene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloroethane	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isodrin	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isophorone	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isosafrole	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Kepone	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methapyrilene	140	U	1600	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl parathion	120	U	1600	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Naphthalene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Nitrobenzene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Parathion	98	U	1600	98	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenacetin	54	U	660	54	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenanthrene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phorate	37	U	1600	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pronamide	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyrene	73	U	330	73	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyridine	71	U	660	71	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Safrole	33	U	660	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*331*	*N J*	*ug/Kg*		*4.24*	*141-79-7*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*13400*	*N*	*ug/Kg*		*4.58*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*431*	*N*	*ug/Kg*		*5.13*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
n-Hexadecanoic acid	*440*	*N J*	*ug/Kg*		*10.95*	*57-10-3*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
13-Tertadecen-1-ol acetate	*273*	*N J*	*ug/Kg*		*13.82*	*1000130-79-8*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*70*		*47 - 125*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorophenol (Surr)	*79*		*54 - 102*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Phenol-d5 (Surr)	*74*		*51 - 104*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Terphenyl-d14 (Surr)	*83*		*59 - 98*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2510		ug/Kg		75	58 - 101
1,2-Dichlorobenzene	3330	2510		ug/Kg		75	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2490		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2740		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2880		ug/Kg		87	56 - 110

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dichlorophenol	3330	2880		ug/Kg		86	57 - 99
2,4-Dimethylphenol	3330	2760		ug/Kg		83	53 - 97
2,4-Dinitrophenol	3330	2590		ug/Kg		78	10 - 89
2,4-Dinitrotoluene	3330	2900		ug/Kg		87	54 - 105
2,6-Dinitrotoluene	3330	2890		ug/Kg		87	55 - 105
2-Chloronaphthalene	3330	2730		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2780		ug/Kg		83	56 - 99
2-Methylnaphthalene	3330	2730		ug/Kg		82	58 - 98
2-Methylphenol	3330	2710		ug/Kg		81	53 - 97
2-Nitroaniline	3330	2720		ug/Kg		82	55 - 108
2-Nitrophenol	3330	2680		ug/Kg		81	59 - 104
3 & 4 Methylphenol	3330	3100		ug/Kg		93	58 - 108
3,3'-Dichlorobenzidine	3330	2380		ug/Kg		72	42 - 104
3-Nitroaniline	3330	2640		ug/Kg		79	43 - 96
4,6-Dinitro-2-methylphenol	3330	2980		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2900		ug/Kg		87	58 - 109
4-Chloro-3-methylphenol	3330	2810		ug/Kg		84	54 - 98
4-Chloroaniline	3330	2150		ug/Kg		64	41 - 83
4-Chlorophenyl phenyl ether	3330	2730		ug/Kg		82	55 - 105
4-Nitroaniline	3330	2710		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2810		ug/Kg		84	48 - 106
Acenaphthene	3330	2780		ug/Kg		83	55 - 106
Acenaphthylene	3330	2780		ug/Kg		83	56 - 109
Anthracene	3330	2870		ug/Kg		86	56 - 103
Benzo[a]anthracene	3330	2960		ug/Kg		89	56 - 107
Benzo[a]pyrene	3330	2820		ug/Kg		85	57 - 109
Benzo[b]fluoranthene	3330	2790		ug/Kg		84	68 - 109
Benzo[g,h,i]perylene	3330	2640		ug/Kg		79	51 - 126
Benzo[k]fluoranthene	3330	2720		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2290		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2520		ug/Kg		76	56 - 99
Bis(2-chloroethyl)ether	3330	2190		ug/Kg		66	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3140		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	3070		ug/Kg		92	60 - 112
Carbazole	3330	2990		ug/Kg		90	53 - 98
Chrysene	3330	2930		ug/Kg		88	54 - 107
Dibenz(a,h)anthracene	3330	2910		ug/Kg		87	52 - 126
Dibenzofuran	3330	2740		ug/Kg		82	55 - 103
Diethylphthalate	3330	2910		ug/Kg		87	54 - 101
Di-n-butyl phthalate	3330	3040		ug/Kg		91	57 - 102
Di-n-octyl phthalate	3330	3310		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3460		ug/Kg		104	63 - 121
Fluoranthene	3330	3010		ug/Kg		90	54 - 100
Fluorene	3330	2870		ug/Kg		86	57 - 106
Hexachlorobenzene	3330	2990		ug/Kg		90	57 - 109
Hexachlorobutadiene	3330	2740		ug/Kg		82	59 - 106
Hexachlorocyclopentadiene	3330	2440		ug/Kg		73	44 - 140

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachloroethane	3330	2420		ug/Kg		73	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2940		ug/Kg		88	52 - 132
Isophorone	3330	2260		ug/Kg		68	55 - 96
Naphthalene	3330	2610		ug/Kg		78	57 - 98
Nitrobenzene	3330	2530		ug/Kg		76	58 - 102
N-Nitrosodi-n-propylamine	3330	2530		ug/Kg		76	54 - 98
Pentachlorophenol	3330	2780		ug/Kg		83	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2550		ug/Kg		77	50 - 96
Pyrene	3330	2960		ug/Kg		89	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*86*		*54 - 102*
Nitrobenzene-d5 (Surr)	*77*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Lab Sample ID: 160-32196-8 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2K4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3520	2450		ug/Kg	☼	70	52 - 103
1,2-Dichlorobenzene	37	U	3520	2370		ug/Kg	☼	67	50 - 98
1,3-Dichlorobenzene	39	U	3520	2270		ug/Kg	☼	64	49 - 96
1,4-Dichlorobenzene	40	U	3520	2350		ug/Kg	☼	67	50 - 96
2,4,5-Trichlorophenol	56	U	3520	2760		ug/Kg	☼	78	41 - 116
2,4,6-Trichlorophenol	49	U	3520	2870		ug/Kg	☼	82	40 - 115
2,4-Dichlorophenol	42	U	3520	2950		ug/Kg	☼	84	47 - 104
2,4-Dimethylphenol	59	U	3520	2810		ug/Kg	☼	80	45 - 105
2,4-Dinitrophenol	350	U	3520	2260		ug/Kg	☼	64	10 - 100
2,4-Dinitrotoluene	130	U	3520	2920		ug/Kg	☼	83	42 - 113
2,6-Dinitrotoluene	67	U	3520	2800		ug/Kg	☼	80	46 - 109
2-Chloronaphthalene	40	U	3520	2810		ug/Kg	☼	80	52 - 108
2-Chlorophenol	41	U	3520	2700		ug/Kg	☼	77	48 - 102
2-Methylnaphthalene	43	U	3520	2750		ug/Kg	☼	78	55 - 97
2-Methylphenol	45	U	3520	2750		ug/Kg	☼	78	46 - 98
2-Nitroaniline	130	U	3520	2800		ug/Kg	☼	80	45 - 111
2-Nitrophenol	150	U	3520	2740		ug/Kg	☼	78	38 - 115
3 & 4 Methylphenol	71	U	3520	3140		ug/Kg	☼	89	48 - 111
3,3'-Dichlorobenzidine	120	U	3520	2150		ug/Kg	☼	61	23 - 102
3-Nitroaniline	110	U	3520	2600		ug/Kg	☼	74	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3520	2780		ug/Kg	☼	79	15 - 118
4-Bromophenyl phenyl ether	52	U	3520	2920		ug/Kg	☼	83	53 - 110
4-Chloro-3-methylphenol	45	U	3520	2870		ug/Kg	☼	82	36 - 111
4-Chloroaniline	50	U	3520	2170		ug/Kg	☼	62	32 - 79

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32196-8 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2K4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorophenyl phenyl ether	46	U	3520	2850		ug/Kg	☼	81	51 - 103
4-Nitroaniline	80	U	3520	2820		ug/Kg	☼	80	36 - 102
4-Nitrophenol	350	U	3520	2720		ug/Kg	☼	77	40 - 113
Acenaphthene	37	U	3520	2820		ug/Kg	☼	80	53 - 105
Acenaphthylene	49	U	3520	2790		ug/Kg	☼	79	55 - 107
Anthracene	52	U	3520	2850		ug/Kg	☼	81	55 - 103
Benzo[a]anthracene	63	U	3520	2870		ug/Kg	☼	82	48 - 112
Benzo[a]pyrene	96	U	3520	2880		ug/Kg	☼	82	46 - 117
Benzo[b]fluoranthene	36	U	3520	2810		ug/Kg	☼	80	45 - 125
Benzo[g,h,i]perylene	36	U	3520	2470		ug/Kg	☼	70	24 - 134
Benzo[k]fluoranthene	86	U	3520	2790		ug/Kg	☼	79	43 - 114
bis(2 chloro-1-methylethyl) ether	45	U	3520	2330		ug/Kg	☼	66	38 - 98
Bis(2-chloroethoxy)methane	40	U	3520	2610		ug/Kg	☼	74	49 - 100
Bis(2-chloroethyl)ether	36	U	3520	2240		ug/Kg	☼	64	49 - 100
Bis(2-ethylhexyl) phthalate	91	U	3520	3230		ug/Kg	☼	92	50 - 113
Butyl benzyl phthalate	99	U	3520	3120		ug/Kg	☼	89	54 - 112
Carbazole	51	U	3520	2990		ug/Kg	☼	85	47 - 102
Chrysene	49	U	3520	2890		ug/Kg	☼	82	45 - 115
Dibenz(a,h)anthracene	70	U	3520	2720		ug/Kg	☼	77	30 - 134
Dibenzofuran	43	U	3520	2770		ug/Kg	☼	79	50 - 102
Diethylphthalate	87	U	3520	2940		ug/Kg	☼	84	46 - 107
Di-n-butyl phthalate	68	U	3520	3110		ug/Kg	☼	88	49 - 107
Di-n-octyl phthalate	140	U	3520	3420		ug/Kg	☼	97	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3520	3410		ug/Kg	☼	97	33 - 140
Fluoranthene	54	U	3520	3000		ug/Kg	☼	85	45 - 109
Fluorene	49	U	3520	2870		ug/Kg	☼	82	45 - 109
Hexachlorobenzene	45	U	3520	2940		ug/Kg	☼	84	48 - 113
Hexachlorobutadiene	43	U	3520	2630		ug/Kg	☼	75	48 - 109
Hexachlorocyclopentadiene	350	U	3520	2100		ug/Kg	☼	60	21 - 144
Hexachloroethane	37	U	3520	2250		ug/Kg	☼	64	44 - 102
Indeno[1,2,3-cd]pyrene	67	U	3520	2750		ug/Kg	☼	78	30 - 136
Isophorone	40	U	3520	2350		ug/Kg	☼	67	48 - 100
Naphthalene	38	U	3520	2620		ug/Kg	☼	74	54 - 98
Nitrobenzene	43	U	3520	2650		ug/Kg	☼	75	51 - 106
N-Nitrosodi-n-propylamine	43	U	3520	2670		ug/Kg	☼	76	47 - 104
Pentachlorophenol	350	U	3520	2390		ug/Kg	☼	68	23 - 116
Phenanthrene	45	U	3520	2890		ug/Kg	☼	82	53 - 106
Phenol	40	U	3520	2590		ug/Kg	☼	74	41 - 100
Pyrene	78	U	3520	2920		ug/Kg	☼	83	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Lab Sample ID: 160-32196-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2K4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3540	2480		ug/Kg	☼	70	52 - 103	1	30
1,2-Dichlorobenzene	37	U	3540	2330		ug/Kg	☼	66	50 - 98	2	30
1,3-Dichlorobenzene	39	U	3540	2180		ug/Kg	☼	62	49 - 96	4	30
1,4-Dichlorobenzene	40	U	3540	2250		ug/Kg	☼	64	50 - 96	4	30
2,4,5-Trichlorophenol	56	U	3540	2940		ug/Kg	☼	83	41 - 116	6	30
2,4,6-Trichlorophenol	49	U	3540	2950		ug/Kg	☼	83	40 - 115	3	30
2,4-Dichlorophenol	42	U	3540	2980		ug/Kg	☼	84	47 - 104	1	30
2,4-Dimethylphenol	59	U	3540	2840		ug/Kg	☼	80	45 - 105	1	30
2,4-Dinitrophenol	350	U	3540	2030		ug/Kg	☼	57	10 - 100	11	30
2,4-Dinitrotoluene	130	U	3540	2850		ug/Kg	☼	80	42 - 113	2	30
2,6-Dinitrotoluene	67	U	3540	2870		ug/Kg	☼	81	46 - 109	2	30
2-Chloronaphthalene	40	U	3540	2740		ug/Kg	☼	77	52 - 108	3	30
2-Chlorophenol	41	U	3540	2710		ug/Kg	☼	77	48 - 102	0	30
2-Methylnaphthalene	43	U	3540	2770		ug/Kg	☼	78	55 - 97	1	30
2-Methylphenol	45	U	3540	2700		ug/Kg	☼	76	46 - 98	2	30
2-Nitroaniline	130	U	3540	2770		ug/Kg	☼	78	45 - 111	1	30
2-Nitrophenol	150	U	3540	2720		ug/Kg	☼	77	38 - 115	1	30
3 & 4 Methylphenol	71	U	3540	3210		ug/Kg	☼	91	48 - 111	2	30
3,3'-Dichlorobenzidine	120	U	3540	2280		ug/Kg	☼	64	23 - 102	6	30
3-Nitroaniline	110	U	3540	2660		ug/Kg	☼	75	32 - 95	2	30
4,6-Dinitro-2-methylphenol	350	U	3540	2660		ug/Kg	☼	75	15 - 118	4	30
4-Bromophenyl phenyl ether	52	U	3540	2900		ug/Kg	☼	82	53 - 110	1	30
4-Chloro-3-methylphenol	45	U	3540	3050		ug/Kg	☼	86	36 - 111	6	30
4-Chloroaniline	50	U	3540	2200		ug/Kg	☼	62	32 - 79	1	30
4-Chlorophenyl phenyl ether	46	U	3540	2930		ug/Kg	☼	83	51 - 103	3	30
4-Nitroaniline	80	U	3540	2800		ug/Kg	☼	79	36 - 102	1	30
4-Nitrophenol	350	U	3540	2800		ug/Kg	☼	79	40 - 113	3	30
Acenaphthene	37	U	3540	2760		ug/Kg	☼	78	53 - 105	2	30
Acenaphthylene	49	U	3540	2790		ug/Kg	☼	79	55 - 107	0	30
Anthracene	52	U	3540	2870		ug/Kg	☼	81	55 - 103	1	30
Benzo[a]anthracene	63	U	3540	3060		ug/Kg	☼	87	48 - 112	6	30
Benzo[a]pyrene	96	U	3540	2830		ug/Kg	☼	80	46 - 117	2	30
Benzo[b]fluoranthene	36	U	3540	2810		ug/Kg	☼	79	45 - 125	0	30
Benzo[g,h,i]perylene	36	U	3540	2340		ug/Kg	☼	66	24 - 134	5	30
Benzo[k]fluoranthene	86	U	3540	2740		ug/Kg	☼	77	43 - 114	2	30
bis(2 chloro-1-methylethyl) ether	45	U	3540	2270		ug/Kg	☼	64	38 - 98	2	30
Bis(2-chloroethoxy)methane	40	U	3540	2570		ug/Kg	☼	72	49 - 100	2	30
Bis(2-chloroethyl)ether	36	U	3540	2250		ug/Kg	☼	64	49 - 100	0	30
Bis(2-ethylhexyl) phthalate	91	U	3540	3300		ug/Kg	☼	93	50 - 113	2	30
Butyl benzyl phthalate	99	U	3540	3170		ug/Kg	☼	90	54 - 112	2	30
Carbazole	51	U	3540	2970		ug/Kg	☼	84	47 - 102	0	30
Chrysene	49	U	3540	3010		ug/Kg	☼	85	45 - 115	4	30
Dibenz(a,h)anthracene	70	U	3540	2670		ug/Kg	☼	76	30 - 134	2	30
Dibenzofuran	43	U	3540	2820		ug/Kg	☼	80	50 - 102	2	30
Diethylphthalate	87	U	3540	3060		ug/Kg	☼	87	46 - 107	4	30
Di-n-butyl phthalate	68	U	3540	3120		ug/Kg	☼	88	49 - 107	0	30
Di-n-octyl phthalate	140	U	3540	3530		ug/Kg	☼	100	35 - 125	3	30
Diphenylamine + N-Nitrosodiphenylamine	36	U	3540	3330		ug/Kg	☼	94	33 - 140	3	30
Fluoranthene	54	U	3540	3020		ug/Kg	☼	85	45 - 109	1	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32196-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2K4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	49	U	3540	2880		ug/Kg	☼	81	45 - 109	0	30
Hexachlorobenzene	45	U	3540	2920		ug/Kg	☼	83	48 - 113	1	30
Hexachlorobutadiene	43	U	3540	2630		ug/Kg	☼	74	48 - 109	0	30
Hexachlorocyclopentadiene	350	U	3540	2040		ug/Kg	☼	58	21 - 144	3	30
Hexachloroethane	37	U	3540	2170		ug/Kg	☼	61	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	67	U	3540	2630		ug/Kg	☼	74	30 - 136	4	30
Isophorone	40	U	3540	2300		ug/Kg	☼	65	48 - 100	2	30
Naphthalene	38	U	3540	2570		ug/Kg	☼	73	54 - 98	2	30
Nitrobenzene	43	U	3540	2500		ug/Kg	☼	71	51 - 106	6	30
N-Nitrosodi-n-propylamine	43	U	3540	2490		ug/Kg	☼	71	47 - 104	7	30
Pentachlorophenol	350	U	3540	2650		ug/Kg	☼	75	23 - 116	10	30
Phenanthrene	45	U	3540	2920		ug/Kg	☼	82	53 - 106	1	30
Phenol	40	U	3540	2610		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3540	3070		ug/Kg	☼	87	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*78*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*71*		*44 - 120*
Phenol-d5 (Surr)	*74*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32196-8	B3L2K4	120	110	114	108
160-32196-9	B3L2N7	120	107	105	103
160-32196-10	B3L2P3	122	102	108	105
160-32196-11	B3L2T1	120	104	110	105
160-32196-12	B3L2N4	126	113	115	107
160-32196-13	B3L2L6	109	106	106	105
160-32196-13 MS	B3L2L6	106	104	103	105
160-32196-13 MSD	B3L2L6	107	106	106	107
160-32196-14	B3L2P0	123	102	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-407594/5	Lab Control Sample	102	98	102	102
LCSD 160-407594/6	Lab Control Sample Dup	98	100	101	104
MB 160-407594/8	Method Blank	105	99	103	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32196-8	B3L2K4	79	81	82	66	77	84
160-32196-8 MS	B3L2K4	80	80	79	74	76	85
160-32196-8 MSD	B3L2K4	81	78	79	71	74	90
160-32196-9	B3L2N7	82	77	76	63	71	80
160-32196-10	B3L2P3	77	78	75	64	68	83
160-32196-11	B3L2T1	74	80	77	66	73	84
160-32196-12 - DL	B3L2N4	0 X	0 X	0 X	0 X	0 X	0 X
160-32196-13 - DL	B3L2L6	0 X	0 X	0 X	0 X	0 X	0 X
160-32196-14	B3L2P0	74	78	79	62	71	80

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32196-1	B3L2N3	98	91
160-32196-1 MS	B3L2N3	84	78
160-32196-1 MSD	B3L2N3	78	73
160-32196-2	B3L2L5	87	81
160-32196-5	B3L2T0	84	81
160-32196-6	B3L2K3	88	75

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32196-3	B3L2N9	81	76
160-32196-4	B3L2N6	86	73
160-32196-7	B3L2P2	104	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1831912											
QC1204180644 LCS											
Diesel Range Organics	66700				62500	UG/KG		94	(70%-130%)	LXA1	12/18/18 16:44
**o-Terphenyl	667				597	UG/KG		89	(50%-150%)		
QC1204180643 MB											
Diesel Range Organics				U	2170	UG/KG					12/18/18 16:05
**o-Terphenyl	666				505	UG/KG		76	(50%-150%)		
QC1204180645 466373001 MS											
Diesel Range Organics	71100	U	2310		62200	UG/KG		88	(70%-130%)		12/18/18 18:02
**o-Terphenyl	711		592		620	UG/KG		87	(50%-150%)		
QC1204180646 466373001 MSD											
Diesel Range Organics	71100	U	2310		62100	UG/KG	0	87	(0%-20%)		12/18/18 18:40
**o-Terphenyl	711		592		600	UG/KG		84	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **466373**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466373

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204180643	MB for batch 1831911	76
1204180644	LCS for batch 1831911	89
466373001	B3MN89	83
1204180645	B3MN89MS	87
1204180646	B3MN89MSD	84
466373002	B3MNB4	75
466373003	B3MN91	70
466373004	B3MN93	77
466373005	B3MN92	84
466373006	B3MN87	81
466373007	B3MN82	88
466373008	B3MNB0	84
466373009	B3MN86	86
466373010	B3MN98	80
466373011	B3MN81	77
466373012	B3MN90	61
466373013	B3MNB1	84
466373014	B3MN83	77
466373015	B3MN99	88
466373016	B3MNB2	77
466373017	B3MN85	104

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 20, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466373**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1832721										
QC1204182424 LCS										
Gasoline Range Organics	500			409	UG/KG		82	(70%-130%)	RXY1	12/19/18 09:40
**Bromofluorobenzene	50.0			46.7	UG/KG		93	(50%-150%)		
QC1204182422 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/19/18 10:14
**Bromofluorobenzene	50.0			48.8	UG/KG		98	(50%-150%)		
QC1204182426 466373001 PS										
Gasoline Range Organics	500	U	0.00	359	ug/L		72	(70%-130%)		12/19/18 20:32
**Bromofluorobenzene	50.0		44.1	47.1	ug/L		94	(50%-150%)		
QC1204182427 466373001 PSD										
Gasoline Range Organics	500	U	0.00	357	ug/L	1	71	(0%-20%)		12/19/18 21:00
**Bromofluorobenzene	50.0		44.1	39.6	ug/L		79	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **466373**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466373

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204182424	LCS for batch 1832720	93
1204182422	MB for batch 1832720	98
466373001	B3MN89	88
466373002	B3MNB4	87
466373003	B3MN91	91
466373004	B3MN93	93
466373005	B3MN92	89
466373006	B3MN87	103
466373007	B3MN82	108
466373008	B3MNB0	99
466373009	B3MN86	76
466373010	B3MN98	82
466373011	B3MN81	87
466373012	B3MN90	79
466373013	B3MNB1	71
466373014	B3MN83	85
466373015	B3MN99	89
466373016	B3MNB2	65
466373017	B3MN85	78
1204182426	B3MN89PS	94
1204182427	B3MN89PSD	79

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466526**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1832655											
QC1204182190 LCS											
Diesel Range Organics	66700				72800	UG/KG		109	(70%-130%)	LXA1	12/20/18 01:55
**o-Terphenyl	667				687	UG/KG		103	(50%-150%)		
QC1204182189 MB											
Diesel Range Organics				U	2170	UG/KG					12/20/18 01:16
**o-Terphenyl	667				576	UG/KG		86	(50%-150%)		
QC1204182191 466526008 MS											
Diesel Range Organics	71100	U	2310		72800	UG/KG		102	(70%-130%)		12/20/18 03:13
**o-Terphenyl	711		720		735	UG/KG		103	(50%-150%)		
QC1204182192 466526008 MSD											
Diesel Range Organics	71100	U	2310		73000	UG/KG	0	103	(0%-20%)		12/20/18 03:52
**o-Terphenyl	711		720		721	UG/KG		101	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **466526**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466526

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204182189	MB for batch 1832655	86
1204182190	LCS for batch 1832655	103
466526008	B3MN84	101
1204182191	B3MN84MS	103
1204182192	B3MN84MSD	101
466526009	B3MN88	97
466526010	B3MN94	89
466526011	B3MN95	93
466526012	B3MN96	87
466526013	B3MN97	94
466526014	B3MNB3	77

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 20, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466526**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1833118										
QC1204183340 LCS										
Gasoline Range Organics	500			409	UG/KG		82	(70%-130%)	RXY1	12/19/18 09:40
**Bromofluorobenzene	50.0			46.7	UG/KG		93	(50%-150%)		
QC1204183339 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/19/18 10:14
**Bromofluorobenzene	50.0			48.8	UG/KG		98	(50%-150%)		
QC1204183341 466526008 PS										
Gasoline Range Organics	500	U	0.00	402	ug/L		80	(70%-130%)		12/20/18 01:18
**Bromofluorobenzene	50.0		40.8	40.8	ug/L		82	(50%-150%)		
QC1204183342 466526008 PSD										
Gasoline Range Organics	500	U	0.00	403	ug/L	0	81	(0%-20%)		12/20/18 01:46
**Bromofluorobenzene	50.0		40.8	41.7	ug/L		83	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

QC Summary

Workorder: **466526**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466526

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204183340	LCS for batch 1833117	93
1204183339	MB for batch 1833117	98
466526008	B3MN84	82
466526009	B3MN88	83
466526010	B3MN94	99
466526011	B3MN95	98
466526012	B3MN96	94
466526013	B3MN97	115
466526014	B3MNB3	105
1204183341	B3MN84PS	82
1204183342	B3MN84PSD	83

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL32166-1, SL32168-1, SL32196-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32166-1, SL32168-1 and SL32196-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L2J4	12/05/18	Soil	C	8081B
B3L2P8	12/05/18	Soil	C	8081B
B3L2M1	12/05/18	Soil	C	8081B
B3L2K9	12/05/18	Soil	C	8081B
B3L2J7	12/05/18	Soil	C	8081B
B3L2K6	12/05/18	Soil	C	8081B
B3L2M4	12/05/18	Soil	C	8081B
B3L2R7	12/05/18	Soil	C	8081B
B3L2P5	12/05/18	Soil	C	8081B
B3L2R4	12/05/18	Soil	C	8081B
B3L2R1	12/05/18	Soil	C	8081B
B3L2T3	12/05/18	Soil	C	8081B
B3L2L2	12/05/18	Soil	C	8081B
B3L2N0	12/05/18	Soil	C	8081B
B3L2M7	12/05/18	Soil	C	8081B
B3L2K0	12/05/18	Soil	C	8081B
B3L2L8	12/05/18	Soil	C	8081B
B3L2N3	12/06/18	Soil	C	8081B
B3L2L5	12/06/18	Soil	C	8081B
B3L2N9	12/06/18	Soil	C	8081B
B3L2N6	12/06/18	Soil	C	8081B
B3L2T0	12/06/18	Soil	C	8081B
B3L2K3	12/06/18	Soil	C	8081B
B3L2P2	12/06/18	Soil	C	8081B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation

Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG SL32166-1, samples B3L2J4 and B3L2P8 were extracted beyond but within 2X the holding time. All results should be qualified as estimates and flagged "UJ" for non-detects and flagged "J" for detects.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32166-1, the MS recoveries for alpha-chlordane, delta-BHC and trans-chlordane were above the upper acceptance limit. The alpha-chlordane and trans-chlordane results for sample B3L2J4 were detects and should be qualified as an estimate and flagged "J." All other sample results were non-detects and should not be qualified as a result.

For SDG SL32168-1, the MS and/or MSD recoveries for 4,4'-DDD, aldrin, alpha-chlordane, beta-BHC, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-BHC, heptachlor, heptachlor epoxide, methoxychlor and trans-chlordane were below the lower acceptance limit but ≥20%. All sample results for these analytes should be qualified as estimates and flagged "UJ" for non-detects and flagged "J" for detects. See the table in Appendix 2 for a listing of affected samples.

For SDG SL32196-1, the MS and/or MSD recoveries for endosulfan I, alpha-chlordane and trans-chlordane were below the lower acceptance limit but ≥20%. All associated sample results should be qualified as estimates and flagged "UJ" for non-detects and flagged "J" for detects. See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32166-1, the LCS recovery for endosulfan I was below the lower acceptance limit. The endosulfan I results for samples B3L2J4 and B3L2P8 were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ."

For SDG SL32168-1, the LCS recovery for endosulfan I was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32196-1, the LCS recovery for endosulfan I was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that LCS analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exception.

For SDG SL32166-1, the MS/MSD RPD for endosulfan II was above the upper acceptance limit. The endosulfan II results for samples B3L2J4 and B3L2P8 were non-detects and should be qualified as estimates and flagged "UJ."

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. No other pesticides CRDLs were provided.

- **Completeness**

SDG SL32166-1, SL32168-1 and SL32196-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to analysis beyond the holding time, high MS recoveries, low MS/MSD recoveries, low LCS recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDG: SL32166-1, SL32168-1, SL32196-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
trans-chlordane, alpha chlordane	J	B3L2J4	Extracted beyond but within 2X the holding time and high matrix spike recovery
All pesticides <u>except</u> trans-chlordane, alpha-chlordane endosulfan I endosulfan II	UJ	B3L2J4, B3L2P8	Extracted beyond but within 2X the holding time
trans-chlordane alpha-chlordane	UJ	B3L2P8	Extracted beyond but within 2X the holding time
endosulfan I	UJ	B3L2J4, B3L2P8	Extracted beyond but within 2X the holding time and low LCS recovery
endosulfan II	UJ	B3L2J4, B3L2P8	Extracted beyond but within 2X the holding time and poor MS/MSD precision
aldrin, beta-BHC, endosulfan II endosulfan sulfate, endrin, endrin ketone, gamma-BHC, heptachlor, heptachlor epoxide, methoxychlor	UJ	B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	Low matrix spike recoveries
endosulfan I	UJ	B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	Low matrix spike recoveries and low LCS recovery
4,4'-DDD	UJ	B3L2M1, B3L2K9,	Low matrix spike

		B3L2K6, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	recoveries
4,4'-DDD	J	B3L2J7, B3L2M4	Low matrix spike recoveries
trans-chlordane	UJ	B3L2M1, B3L2K9, B3L2T3, B3L2L2, B3L2N0, B3L2L8	Low matrix spike recoveries
trans-chlordane	J	B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2M7, B3L2K0, B3L2N3, B3L2N9, B3L2N6, B3L2P2	Low matrix spike recoveries
dieldrin	UJ	B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	Low matrix spike recoveries
dieldrin	J	B3L2R7	Low matrix spike recoveries
alpha-chlordane	UJ	B3L2M1, B3L2K9, B3L2K6, B3L2R7, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2L8	Low matrix spike recoveries
alpha-chlordane	J	B3L2M4, B3L2P5, B3L2R4, B3L2K0, B3L2J7	Low matrix spike recoveries
endrin aldehyde	UJ	B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	Low matrix spike recoveries
endrin aldehyde	J	B3L2P5	Low matrix spike recoveries
alpha-chlordane trans-chlordane	UJ	B3L2L5, B3L2T0, B3L2K3	Low matrix spike recoveries

alpha-chlordane	UJ	B3L2N9	Low matrix spike recoveries
alpha-chlordane	J	B3L2N3, B3L2N6, B3L2P2	Low matrix spike recoveries
endosulfan I	UJ	B3L2N3, B3L2L5, B3L2N9, B3L2N6, B3L2T0, B3L2K3, B3L2P2	Low matrix spike recovery and low LCS recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/28/19	
			SDG: SL32166-1, SL32168-1, SL32196-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32166-1: B3L2J4, B3L2P8					
SL32168-1: B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8					
SL32196-1: B3L2N3, B3L2L5, B3L2N9, B3L2N6, B3L2T0, B3L2K3, B3L2P2					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A
DDT and endrin breakdowns acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL32166-1: alpha-chlordane 134% (MS), delta-BHC 134% (MS), trans-chlordane 138% (MS)

SL32168-1: 4,4'-DDD 61% (MS), aldrin 67% (MS), alpha-chlordane 66% (MS), beta-BHC 66% (MS), dieldrin 68% (MS), endosulfan I 54%/67%, endosulfan II 56% (MS), endosulfan sulfate 60% (MS), endrin 63% (MS), endrin aldehyde 60% (MS), endrin ketone 64% (MS), gamma-BHC 69% (MS), heptachlor 66% (MS), heptachlor epoxide 66% (MS), methoxychlor 62% (MS), trans-chlordane 68% (MS)

SL32196-1: endosulfan I 69%/63%, alpha-chlordane 61% (MSD), trans-chlordane 59% (MSD)

LCS

SL32166-1: endosulfan I 69%

SL32168-1: endosulfan I 68%

SL32196-1: endosulfan I 69%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SL32166-1 endosulfan II 45%

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No (N/A)
Positive results resolved acceptably?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SL32166-1: B3L2J4, B3L2P8 extracted 15 days after collection

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. No other CRDL were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32166-1 MSD
Matrix: Soil
Analysis Batch: 405932

Client Sample ID: B3L2L3
Prep Type: Total/NA
Prep Batch: 405431

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	35	U	3480	3350		ug/Kg	☼	96	33 - 140	2	30
Fluoranthene	53	U	3480	2940		ug/Kg	☼	85	45 - 109	0	30
Fluorene	48	U	3480	2900		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3480	2870		ug/Kg	☼	82	48 - 113	1	30
Hexachlorobutadiene	42	U	3480	2700		ug/Kg	☼	78	48 - 109	4	30
Hexachlorocyclopentadiene	350	U	3480	2470		ug/Kg	☼	71	21 - 144	2	30
Hexachloroethane	37	U	3480	2360		ug/Kg	☼	68	44 - 102	9	30
Indeno[1,2,3-cd]pyrene	67	U	3480	3350		ug/Kg	☼	96	30 - 136	0	30
Isophorone	40	U	3480	2230		ug/Kg	☼	64	48 - 100	8	30
Naphthalene	37	U	3480	2600		ug/Kg	☼	75	54 - 98	4	30
Nitrobenzene	43	U	3480	2570		ug/Kg	☼	74	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3480	2500		ug/Kg	☼	72	47 - 104	9	30
Pentachlorophenol	350	U	3480	2610		ug/Kg	☼	75	23 - 116	3	30
Phenanthrene	45	U	3480	2870		ug/Kg	☼	83	53 - 106	1	30
Phenol	40	U	3480	2550		ug/Kg	☼	73	41 - 100	5	30
Pyrene	77	U	3480	2870		ug/Kg	☼	83	39 - 130	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*75*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-406865/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Toxaphene	23	U	67	23	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*	*12/20/18 11:36*	*12/31/18 20:13*	*1*
Tetrachloro-m-xylene	*88*		*71 - 111*	*12/20/18 11:36*	*12/31/18 20:13*	*1*

Lab Sample ID: LCS 160-406865/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.3		ug/Kg		92	72 - 117
4,4'-DDE	16.7	14.2		ug/Kg		85	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.0		ug/Kg		84	70 - 102
alpha-BHC	16.7	14.7		ug/Kg		88	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	14.1		ug/Kg		85	68 - 102
delta-BHC	16.7	15.5		ug/Kg		93	72 - 117
Dieldrin	16.7	14.7		ug/Kg		88	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		69	34 - 96
Endosulfan II	16.7	13.4		ug/Kg		80	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	14.3		ug/Kg		86	76 - 116
Endrin aldehyde	16.7	14.6		ug/Kg		87	54 - 97
Endrin ketone	16.7	15.3		ug/Kg		92	71 - 113
gamma-BHC (Lindane)	16.7	14.3		ug/Kg		86	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.3		ug/Kg		86	72 - 107
Methoxychlor	16.7	14.9		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.3		ug/Kg		86	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U Z N	17.9	22.4	N	ug/Kg	☼	125	60 - 121
4,4'-DDE	0.91	U Z N	17.9	21.7	N	ug/Kg	☼	121	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.68	U Z	17.9	21.7		ug/Kg	☼	121	59 - 122
Aldrin	0.62	U Z N	17.9	20.2	N	ug/Kg	☼	113	57 - 110
alpha-BHC	0.42	U Z N	17.9	21.5	N	ug/Kg	☼	120	62 - 117
alpha-Chlordane	6.1	Z P N	17.9	30.0	N	ug/Kg	☼	134	58 - 114
beta-BHC	0.50	U Z N	17.9	21.1	N	ug/Kg	☼	118	61 - 108
delta-BHC	0.37	U Z N	17.9	23.9	N	ug/Kg	☼	134	64 - 121
Dieldrin	0.23	U Z N	17.9	22.7	N	ug/Kg	☼	127	57 - 114
Endosulfan I	0.62	U Z N	17.9	18.0	N	ug/Kg	☼	100	31 - 89
Endosulfan II	0.32	U Z N	17.9	23.1	N	ug/Kg	☼	129	40 - 93
Endosulfan sulfate	0.37	U Z N	17.9	20.6	N	ug/Kg	☼	115	56 - 112
Endrin	0.36	U Z	17.9	22.3		ug/Kg	☼	124	64 - 125
Endrin aldehyde	0.42	U Z N	17.9	21.3	N	ug/Kg	☼	119	45 - 101
Endrin ketone	0.45	U Z N	17.9	20.8	N	ug/Kg	☼	116	59 - 115
gamma-BHC (Lindane)	0.52	U Z N	17.9	21.4	N	ug/Kg	☼	120	61 - 113
Heptachlor	0.31	U Z	17.9	19.2		ug/Kg	☼	107	33 - 150
Heptachlor epoxide	0.51	U Z N	17.9	22.4	N	ug/Kg	☼	125	60 - 114
Methoxychlor	0.90	U Z	17.9	18.5		ug/Kg	☼	104	58 - 130
trans-Chlordane	5.9	Z N	17.9	30.5	N	ug/Kg	☼	138	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*108*		*72 - 115*
Tetrachloro-m-xylene	*108*		*71 - 111*

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U Z N	18.0	16.3	y	ug/Kg	☼	90	60 - 121	32	30
4,4'-DDE	0.91	U Z N	18.0	15.9	y	ug/Kg	☼	88	63 - 111	31	30
4,4'-DDT	0.68	U Z	18.0	16.3		ug/Kg	☼	91	59 - 122	28	30
Aldrin	0.62	U Z N	18.0	15.2		ug/Kg	☼	84	57 - 110	28	30
alpha-BHC	0.42	U Z N	18.0	15.7	y	ug/Kg	☼	87	62 - 117	32	30
alpha-Chlordane	6.1	Z P N	18.0	21.4	y	ug/Kg	☼	85	58 - 114	34	30
beta-BHC	0.50	U Z N	18.0	15.4	y	ug/Kg	☼	85	61 - 108	32	30
delta-BHC	0.37	U Z N	18.0	17.6	y	ug/Kg	☼	98	64 - 121	31	30
Dieldrin	0.23	U Z N	18.0	17.0		ug/Kg	☼	94	57 - 114	29	30
Endosulfan I	0.62	U Z N	18.0	13.3		ug/Kg	☼	74	31 - 89	29	30
Endosulfan II	0.32	U Z N	18.0	14.7	y	ug/Kg	☼	81	40 - 93	45	30
Endosulfan sulfate	0.37	U Z N	18.0	15.7		ug/Kg	☼	87	56 - 112	27	30
Endrin	0.36	U Z	18.0	16.3	y	ug/Kg	☼	90	64 - 125	31	30
Endrin aldehyde	0.42	U Z N	18.0	15.4	y	ug/Kg	☼	86	45 - 101	32	30
Endrin ketone	0.45	U Z N	18.0	15.9		ug/Kg	☼	88	59 - 115	27	30
gamma-BHC (Lindane)	0.52	U Z N	18.0	15.8		ug/Kg	☼	88	61 - 113	30	30
Heptachlor	0.31	U Z	18.0	14.7		ug/Kg	☼	82	33 - 150	27	30
Heptachlor epoxide	0.51	U Z N	18.0	16.5		ug/Kg	☼	92	60 - 114	30	30
Methoxychlor	0.90	U Z	18.0	13.7		ug/Kg	☼	76	58 - 130	30	30
trans-Chlordane	5.9	Z N	18.0	22.0	y	ug/Kg	☼	90	62 - 114	32	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	79		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	154		ug/Kg	☼	86	23 - 140
Aroclor 1260	11	U	180	165		ug/Kg	☼	92	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	180	150		ug/Kg	☼	83	23 - 140	3	30
Aroclor 1260	11	U	180	158		ug/Kg	☼	88	20 - 131	4	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32166-19	B3L2J4	96	82
160-32166-19 MSD	B3L2J4	92	79
160-32166-20	B3L2P8	86	74

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32166-19 MS	B3L2J4	108	108

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32166-19	B3L2J4	80
160-32166-19 MS	B3L2J4	88
160-32166-19 MSD	B3L2J4	79
160-32166-20	B3L2P8	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-405241/1-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405241

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
Toxaphene	23	U	67	23	ug/Kg		12/12/18 10:08	12/24/18 00:00	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/12/18 10:08	12/24/18 00:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*85*		*72 - 115*	*12/12/18 10:08*	*12/24/18 00:00*	*1*
Tetrachloro-m-xylene	*87*		*71 - 111*	*12/12/18 10:08*	*12/24/18 00:00*	*1*

Lab Sample ID: LCS 160-405241/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.1		ug/Kg		84	72 - 117
4,4'-DDE	16.7	14.5		ug/Kg		87	75 - 104
4,4'-DDT	16.7	14.4		ug/Kg		86	72 - 119
Aldrin	16.7	13.7		ug/Kg		82	70 - 102
alpha-BHC	16.7	14.2		ug/Kg		85	72 - 111
alpha-Chlordane	16.7	14.0		ug/Kg		84	72 - 105
beta-BHC	16.7	13.6		ug/Kg		82	68 - 102
delta-BHC	16.7	14.6		ug/Kg		88	72 - 117
Dieldrin	16.7	14.2		ug/Kg		85	72 - 108
Endosulfan I	16.7	11.4		ug/Kg		68	34 - 96
Endosulfan II	16.7	12.1		ug/Kg		72	46 - 96
Endosulfan sulfate	16.7	13.0		ug/Kg		78	68 - 108
Endrin	16.7	13.5		ug/Kg		81	76 - 116
Endrin aldehyde	16.7	13.0		ug/Kg		78	54 - 97
Endrin ketone	16.7	13.9		ug/Kg		83	71 - 113
gamma-BHC (Lindane)	16.7	13.7		ug/Kg		82	71 - 107
Heptachlor	16.7	13.4		ug/Kg		80	55 - 128

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-405241/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	16.7	13.9		ug/Kg		83	72 - 107
Methoxychlor	16.7	13.7		ug/Kg		82	71 - 124
trans-Chlordane	16.7	14.1		ug/Kg		84	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32168-1 MS
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U	17.8	10.9		ug/Kg	☼	61	60 - 121
4,4'-DDE	0.89	U	17.8	12.5		ug/Kg	☼	70	63 - 111
4,4'-DDT	0.67	U	17.8	12.7		ug/Kg	☼	71	59 - 122
Aldrin	0.61	U	17.8	11.9		ug/Kg	☼	67	57 - 110
alpha-BHC	0.41	U	17.8	12.8		ug/Kg	☼	72	62 - 117
alpha-Chlordane	1.0	U	17.8	11.7		ug/Kg	☼	66	58 - 114
beta-BHC	0.49	U	17.8	11.7		ug/Kg	☼	66	61 - 108
delta-BHC	0.36	U	17.8	12.6		ug/Kg	☼	71	64 - 121
Dieldrin	0.23	U	17.8	12.2		ug/Kg	☼	68	57 - 114
Endosulfan I	0.61	U	17.8	9.61		ug/Kg	☼	54	31 - 89
Endosulfan II	0.31	U	17.8	10.0		ug/Kg	☼	56	40 - 93
Endosulfan sulfate	0.36	U	17.8	10.7		ug/Kg	☼	60	56 - 112
Endrin	0.35	U N	17.8	11.3	N	ug/Kg	☼	63	64 - 125
Endrin aldehyde	0.41	U	17.8	10.6		ug/Kg	☼	60	45 - 101
Endrin ketone	0.44	U	17.8	11.4		ug/Kg	☼	64	59 - 115
gamma-BHC (Lindane)	0.51	U	17.8	12.2		ug/Kg	☼	69	61 - 113
Heptachlor	0.30	U	17.8	11.7		ug/Kg	☼	66	33 - 150
Heptachlor epoxide	0.50	U	17.8	11.9		ug/Kg	☼	67	60 - 114
Methoxychlor	0.88	U	17.8	11.0		ug/Kg	☼	62	58 - 130
trans-Chlordane	0.41	U	17.8	12.1		ug/Kg	☼	68	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*72*		*72 - 115*
Tetrachloro-m-xylene	*71*		*71 - 111*

Lab Sample ID: 160-32168-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U	17.7	14.0		ug/Kg	☼	79	60 - 121	25	30
4,4'-DDE	0.89	U	17.7	16.0		ug/Kg	☼	90	63 - 111	25	30
4,4'-DDT	0.67	U	17.7	16.7		ug/Kg	☼	95	59 - 122	27	30
Aldrin	0.61	U	17.7	14.6		ug/Kg	☼	83	57 - 110	21	30
alpha-BHC	0.41	U	17.7	15.6		ug/Kg	☼	88	62 - 117	20	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32168-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.0	U	17.7	14.6		ug/Kg	☼	83	58 - 114	22	30
beta-BHC	0.49	U	17.7	14.6		ug/Kg	☼	82	61 - 108	22	30
delta-BHC	0.36	U	17.7	16.1		ug/Kg	☼	91	64 - 121	24	30
Dieldrin	0.23	U	17.7	15.2		ug/Kg	☼	86	57 - 114	22	30
Endosulfan I	0.61	U	17.7	11.9		ug/Kg	☼	67	31 - 89	21	30
Endosulfan II	0.31	U	17.7	12.6		ug/Kg	☼	72	40 - 93	23	30
Endosulfan sulfate	0.36	U	17.7	13.9		ug/Kg	☼	79	56 - 112	26	30
Endrin	0.35	U N	17.7	14.1		ug/Kg	☼	80	64 - 125	22	30
Endrin aldehyde	0.41	U	17.7	13.6		ug/Kg	☼	77	45 - 101	25	30
Endrin ketone	0.44	U	17.7	14.6		ug/Kg	☼	82	59 - 115	25	30
gamma-BHC (Lindane)	0.51	U	17.7	15.1		ug/Kg	☼	85	61 - 113	21	30
Heptachlor	0.30	U	17.7	14.1		ug/Kg	☼	80	33 - 150	19	30
Heptachlor epoxide	0.50	U	17.7	14.7		ug/Kg	☼	83	60 - 114	21	30
Methoxychlor	0.88	U	17.7	14.3		ug/Kg	☼	81	58 - 130	26	30
trans-Chlordane	0.41	U	17.7	15.1		ug/Kg	☼	85	62 - 114	22	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405366/1-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405366

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1248	11	U	33	11	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1254	13	U	33	13	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1260	10	U	33	10	ug/Kg		12/12/18 12:46	12/19/18 03:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*	*12/12/18 12:46*	*12/19/18 03:20*	*1*

Lab Sample ID: LCS 160-405366/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	156		ug/Kg		94	52 - 134
Aroclor 1260	167	159		ug/Kg		95	50 - 132

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32168-1	B3L2M1	84	79
160-32168-1 MSD	B3L2M1	91	89
160-32168-2	B3L2K9	80	84
160-32168-3	B3L2J7	89	91
160-32168-4	B3L2K6	84	83
160-32168-5	B3L2M4	84	85
160-32168-6	B3L2R7	96	76
160-32168-7	B3L2P5	78	84
160-32168-9	B3L2R1	83	86
160-32168-10	B3L2T3	90	80
160-32168-11	B3L2L2	80	78
160-32168-12	B3L2N0	82	80
160-32168-13	B3L2M7	85	84
160-32168-14	B3L2K0	95	89
160-32168-15	B3L2L8	85	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32168-1 MS	B3L2M1	72	71

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32168-8	B3L2R4	81	79

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)						
LCS 160-405241/2-A	Lab Control Sample	87	86						
MB 160-405241/1-A	Method Blank	85	87						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
160-32168-1	B3L2M1	81							
160-32168-1 MS	B3L2M1	87							
160-32168-1 MSD	B3L2M1	80							
160-32168-2	B3L2K9	81							
160-32168-3	B3L2J7	73							
160-32168-4	B3L2K6	71							
160-32168-5	B3L2M4	68							
160-32168-6	B3L2R7	68							
160-32168-7	B3L2P5	78							
160-32168-8	B3L2R4	70							
160-32168-9	B3L2R1	77							
160-32168-10	B3L2T3	77							
160-32168-11	B3L2L2	76							
160-32168-12	B3L2N0	76							
160-32168-13	B3L2M7	79							
160-32168-14	B3L2K0	83							
160-32168-15	B3L2L8	81							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB1 (23-146)							
LCS 160-405366/2-A	Lab Control Sample	81							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32196-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2K4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	49	U	3540	2880		ug/Kg	☼	81	45 - 109	0	30
Hexachlorobenzene	45	U	3540	2920		ug/Kg	☼	83	48 - 113	1	30
Hexachlorobutadiene	43	U	3540	2630		ug/Kg	☼	74	48 - 109	0	30
Hexachlorocyclopentadiene	350	U	3540	2040		ug/Kg	☼	58	21 - 144	3	30
Hexachloroethane	37	U	3540	2170		ug/Kg	☼	61	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	67	U	3540	2630		ug/Kg	☼	74	30 - 136	4	30
Isophorone	40	U	3540	2300		ug/Kg	☼	65	48 - 100	2	30
Naphthalene	38	U	3540	2570		ug/Kg	☼	73	54 - 98	2	30
Nitrobenzene	43	U	3540	2500		ug/Kg	☼	71	51 - 106	6	30
N-Nitrosodi-n-propylamine	43	U	3540	2490		ug/Kg	☼	71	47 - 104	7	30
Pentachlorophenol	350	U	3540	2650		ug/Kg	☼	75	23 - 116	10	30
Phenanthrene	45	U	3540	2920		ug/Kg	☼	82	53 - 106	1	30
Phenol	40	U	3540	2610		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3540	3070		ug/Kg	☼	87	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*81*		*47 - 125*
2-Fluorobiphenyl (Surr)	*78*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*71*		*44 - 120*
Phenol-d5 (Surr)	*74*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Toxaphene	23	U	67	23	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*	*12/20/18 11:36*	*12/31/18 20:13*	*1*
Tetrachloro-m-xylene	*88*		*71 - 111*	*12/20/18 11:36*	*12/31/18 20:13*	*1*

Lab Sample ID: LCS 160-406865/2-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.3		ug/Kg		92	72 - 117
4,4'-DDE	16.7	14.2		ug/Kg		85	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.0		ug/Kg		84	70 - 102
alpha-BHC	16.7	14.7		ug/Kg		88	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	14.1		ug/Kg		85	68 - 102
delta-BHC	16.7	15.5		ug/Kg		93	72 - 117
Dieldrin	16.7	14.7		ug/Kg		88	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		69	34 - 96
Endosulfan II	16.7	13.4		ug/Kg		80	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	14.3		ug/Kg		86	76 - 116
Endrin aldehyde	16.7	14.6		ug/Kg		87	54 - 97
Endrin ketone	16.7	15.3		ug/Kg		92	71 - 113
gamma-BHC (Lindane)	16.7	14.3		ug/Kg		86	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.3		ug/Kg		86	72 - 107
Methoxychlor	16.7	14.9		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.3		ug/Kg		86	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32196-1 MS
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.38	U	18.1	15.8		ug/Kg	☼	87	60 - 121
4,4'-DDE	0.92	U	18.1	15.6		ug/Kg	☼	86	63 - 111
4,4'-DDT	0.68	U	18.1	15.5		ug/Kg	☼	85	59 - 122
Aldrin	0.62	U	18.1	14.7		ug/Kg	☼	81	57 - 110
alpha-BHC	0.42	U	18.1	15.3		ug/Kg	☼	84	62 - 117

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32196-1 MS
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
alpha-Chlordane	13	P	18.1	26.3		ug/Kg	☼	71	58 - 114
beta-BHC	0.50	U	18.1	15.4		ug/Kg	☼	85	61 - 108
delta-BHC	0.37	U	18.1	17.5		ug/Kg	☼	97	64 - 121
Dieldrin	0.23	U	18.1	16.5		ug/Kg	☼	91	57 - 114
Endosulfan I	0.62	U	18.1	12.6		ug/Kg	☼	69	31 - 89
Endosulfan II	0.32	U	18.1	14.8		ug/Kg	☼	82	40 - 93
Endosulfan sulfate	0.37	U	18.1	15.8		ug/Kg	☼	87	56 - 112
Endrin	0.36	U	18.1	16.5		ug/Kg	☼	91	64 - 125
Endrin aldehyde	0.42	U	18.1	17.1		ug/Kg	☼	94	45 - 101
Endrin ketone	0.45	U	18.1	15.4		ug/Kg	☼	85	59 - 115
gamma-BHC (Lindane)	0.52	U	18.1	15.8		ug/Kg	☼	87	61 - 113
Heptachlor	0.31	U	18.1	15.0		ug/Kg	☼	83	33 - 150
Heptachlor epoxide	0.52	U	18.1	16.7		ug/Kg	☼	92	60 - 114
Methoxychlor	0.90	U	18.1	12.9		ug/Kg	☼	71	58 - 130
trans-Chlordane	19	N	18.1	31.8		ug/Kg	☼	73	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*78*		*71 - 111*

Lab Sample ID: 160-32196-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.38	U	18.2	14.5		ug/Kg	☼	79	60 - 121	9	30
4,4'-DDE	0.92	U	18.3	14.3		ug/Kg	☼	78	63 - 111	9	30
4,4'-DDT	0.68	U	18.2	14.7		ug/Kg	☼	81	59 - 122	5	30
Aldrin	0.62	U	18.2	13.7		ug/Kg	☼	75	57 - 110	7	30
alpha-BHC	0.42	U	18.2	14.7		ug/Kg	☼	80	62 - 117	4	30
alpha-Chlordane	13	P	18.2	24.4		ug/Kg	☼	61	58 - 114	7	30
beta-BHC	0.50	U	18.2	14.0		ug/Kg	☼	77	61 - 108	10	30
delta-BHC	0.37	U	18.2	15.7		ug/Kg	☼	86	64 - 121	11	30
Dieldrin	0.23	U	18.3	15.2		ug/Kg	☼	83	57 - 114	8	30
Endosulfan I	0.62	U	18.2	11.5		ug/Kg	☼	63	31 - 89	9	30
Endosulfan II	0.32	U	18.2	13.6		ug/Kg	☼	74	40 - 93	9	30
Endosulfan sulfate	0.37	U	18.2	14.3		ug/Kg	☼	78	56 - 112	10	30
Endrin	0.36	U	18.3	15.2		ug/Kg	☼	83	64 - 125	8	30
Endrin aldehyde	0.42	U	18.2	15.6		ug/Kg	☼	86	45 - 101	9	30
Endrin ketone	0.45	U	18.3	14.3		ug/Kg	☼	78	59 - 115	7	30
gamma-BHC (Lindane)	0.52	U	18.3	15.0		ug/Kg	☼	82	61 - 113	5	30
Heptachlor	0.31	U	18.2	14.8		ug/Kg	☼	81	33 - 150	1	30
Heptachlor epoxide	0.52	U	18.2	15.2		ug/Kg	☼	83	60 - 114	9	30
Methoxychlor	0.90	U	18.2	12.7		ug/Kg	☼	70	58 - 130	1	30
trans-Chlordane	19	N	18.2	29.2	N	ug/Kg	☼	59	62 - 114	9	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32196-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	78		72 - 115
Tetrachloro-m-xylene	73		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32196-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	157		ug/Kg	☼	87	23 - 140
Aroclor 1260	11	U	181	166		ug/Kg	☼	92	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	78		23 - 146

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32196-1	B3L2N3	98	91
160-32196-1 MS	B3L2N3	84	78
160-32196-1 MSD	B3L2N3	78	73
160-32196-2	B3L2L5	87	81
160-32196-5	B3L2T0	84	81
160-32196-6	B3L2K3	88	75

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB1 (72-115)	TCX2 (71-111)
160-32196-3	B3L2N9	81	76
160-32196-4	B3L2N6	86	73
160-32196-7	B3L2P2	104	91

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32196-1	B3L2N3	91
160-32196-1 MS	B3L2N3	78
160-32196-1 MSD	B3L2N3	74
160-32196-2	B3L2L5	72
160-32196-3	B3L2N9	72
160-32196-4	B3L2N6	74
160-32196-5	B3L2T0	78
160-32196-6	B3L2K3	87
160-32196-7	B3L2P2	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-405132/2-A	Lab Control Sample	93
MB 160-405132/1-A	Method Blank	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL32166-1, SL32168-1, SL32196-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32166-1, SL32168-1 and SL32196-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L2J4	12/05/18	Soil	C	8082A
B3L2P8	12/05/18	Soil	C	8082A
B3L2M1	12/05/18	Soil	C	8082A
B3L2K9	12/05/18	Soil	C	8082A
B3L2J7	12/05/18	Soil	C	8082A
B3L2K6	12/05/18	Soil	C	8082A
B3L2M4	12/05/18	Soil	C	8082A
B3L2R7	12/05/18	Soil	C	8082A
B3L2P5	12/05/18	Soil	C	8082A
B3L2R4	12/05/18	Soil	C	8082A
B3L2R1	12/05/18	Soil	C	8082A
B3L2T3	12/05/18	Soil	C	8082A
B3L2L2	12/05/18	Soil	C	8082A
B3L2N0	12/05/18	Soil	C	8082A
B3L2M7	12/05/18	Soil	C	8082A
B3L2K0	12/05/18	Soil	C	8082A
B3L2L8	12/05/18	Soil	C	8082A
B3L2N3	12/06/18	Soil	C	8082A
B3L2L5	12/06/18	Soil	C	8082A
B3L2N9	12/06/18	Soil	C	8082A
B3L2N6	12/06/18	Soil	C	8082A
B3L2T0	12/06/18	Soil	C	8082A
B3L2K3	12/06/18	Soil	C	8082A
B3L2P2	12/06/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation

Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL32168-1, the decachlorobiphenyl surrogate recoveries for samples B3L2M4 and B3L2R7 were below the lower acceptance limit but ≥10%. All sample results were non-detects and should be qualified as estimates and flagged "UJ."

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable.

Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for aroclor-1016, aroclor-1254 and aroclor-1260 were met. CRDLs for other PCBs analytes were not provided in the SAP.

- **Completeness**

SDGs SL32166-1, SL32168-1 and SL32196-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL32166-1, SL32168-1, SL32196-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Aroclor-1016, -1221, -1232, -1242, -1248, -1254 & -1260	UJ	B3L2M4, B3L2R7	Low surrogate recoveries.

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/23/19	
			SDG: SL32166-1, SL32168-1, SL32196-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32166-1: B3L2J4, B3L2P8					
SL32168-1: B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8					
SL32196-1: B3L2N3, B3L2L5, B3L2N9, B3L2N6, B3L2T0, B3L2K3, B3L2P2					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SL32168-1: DCB1 B3L2M4 68%, B3L2R7 68%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	79		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	180	154		ug/Kg	☼	86	23 - 140
Aroclor 1260	11	U	180	165		ug/Kg	☼	92	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	180	150		ug/Kg	☼	83	23 - 140	3	30
Aroclor 1260	11	U	180	158		ug/Kg	☼	88	20 - 131	4	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*79*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406155/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:23	12/19/18 18:02	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:23	12/19/18 18:02	1

Lab Sample ID: LCS 160-406155/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.30	9.01		mg/Kg		97	80 - 120

Lab Sample ID: LCSSRM 160-406155/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.03	D	mg/Kg		81.9	53.5 - 124.5

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U D N	19.6	7.20	B D N	mg/Kg	☼	37	75 - 125
Lithium	6.2	B D	9.78	16.75	D	mg/Kg	☼	107	75 - 125

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U D N	20.7	8.29	B D N	mg/Kg	☼	40	75 - 125	14	30
Lithium	6.2	B D	10.4	17.95	D	mg/Kg	☼	113	75 - 125	7	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)							
160-32166-19	B3L2J4	96	82							
160-32166-19 MSD	B3L2J4	92	79							
160-32166-20	B3L2P8	86	74							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	DCB1 (72-115)	TCX2 (71-111)							
160-32166-19 MS	B3L2J4	108	108							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)							
LCS 160-406865/2-A	Lab Control Sample	102	86							
MB 160-406865/1-A	Method Blank	98	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	DCB1 (23-146)								
160-32166-19	B3L2J4	80								
160-32166-19 MS	B3L2J4	88								
160-32166-19 MSD	B3L2J4	79								
160-32166-20	B3L2P8	73								

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
LCS 160-405132/2-A	Lab Control Sample	93							
MB 160-405132/1-A	Method Blank	89							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32168-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405241

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.0	U	17.7	14.6		ug/Kg	☼	83	58 - 114	22	30
beta-BHC	0.49	U	17.7	14.6		ug/Kg	☼	82	61 - 108	22	30
delta-BHC	0.36	U	17.7	16.1		ug/Kg	☼	91	64 - 121	24	30
Dieldrin	0.23	U	17.7	15.2		ug/Kg	☼	86	57 - 114	22	30
Endosulfan I	0.61	U	17.7	11.9		ug/Kg	☼	67	31 - 89	21	30
Endosulfan II	0.31	U	17.7	12.6		ug/Kg	☼	72	40 - 93	23	30
Endosulfan sulfate	0.36	U	17.7	13.9		ug/Kg	☼	79	56 - 112	26	30
Endrin	0.35	U N	17.7	14.1		ug/Kg	☼	80	64 - 125	22	30
Endrin aldehyde	0.41	U	17.7	13.6		ug/Kg	☼	77	45 - 101	25	30
Endrin ketone	0.44	U	17.7	14.6		ug/Kg	☼	82	59 - 115	25	30
gamma-BHC (Lindane)	0.51	U	17.7	15.1		ug/Kg	☼	85	61 - 113	21	30
Heptachlor	0.30	U	17.7	14.1		ug/Kg	☼	80	33 - 150	19	30
Heptachlor epoxide	0.50	U	17.7	14.7		ug/Kg	☼	83	60 - 114	21	30
Methoxychlor	0.88	U	17.7	14.3		ug/Kg	☼	81	58 - 130	26	30
trans-Chlordane	0.41	U	17.7	15.1		ug/Kg	☼	85	62 - 114	22	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405366/1-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405366

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1248	11	U	33	11	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1254	13	U	33	13	ug/Kg		12/12/18 12:46	12/19/18 03:20	1
Aroclor 1260	10	U	33	10	ug/Kg		12/12/18 12:46	12/19/18 03:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*	*12/12/18 12:46*	*12/19/18 03:20*	*1*

Lab Sample ID: LCS 160-405366/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	156		ug/Kg		94	52 - 134
Aroclor 1260	167	159		ug/Kg		95	50 - 132

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-405366/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405366

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*23 - 146*

Lab Sample ID: 160-32168-1 MS
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	176	166		ug/Kg	☼	94	23 - 140
Aroclor 1260	11	U	176	173		ug/Kg	☼	98	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Lab Sample ID: 160-32168-1 MSD
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	176	153		ug/Kg	☼	87	23 - 140	9	30
Aroclor 1260	11	U	176	155		ug/Kg	☼	88	20 - 131	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*80*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406155/1-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406155

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:23	12/19/18 18:02	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:23	12/19/18 18:02	1

Lab Sample ID: LCS 160-406155/2-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406155

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.30	9.01		mg/Kg		97	80 - 120

Lab Sample ID: LCSSRM 160-406155/3-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406155

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.03	D	mg/Kg		81.9	53.5 - 124.5

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)						
LCS 160-405241/2-A	Lab Control Sample	87	86						
MB 160-405241/1-A	Method Blank	85	87						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB1 (23-146)						
160-32168-1	B3L2M1	81						
160-32168-1 MS	B3L2M1	87						
160-32168-1 MSD	B3L2M1	80						
160-32168-2	B3L2K9	81						
160-32168-3	B3L2J7	73						
160-32168-4	B3L2K6	71						
160-32168-5	B3L2M4	68						
160-32168-6	B3L2R7	68						
160-32168-7	B3L2P5	78						
160-32168-8	B3L2R4	70						
160-32168-9	B3L2R1	77						
160-32168-10	B3L2T3	77						
160-32168-11	B3L2L2	76						
160-32168-12	B3L2N0	76						
160-32168-13	B3L2M7	79						
160-32168-14	B3L2K0	83						
160-32168-15	B3L2L8	81						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB1 (23-146)						
LCS 160-405366/2-A	Lab Control Sample	81						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**							
MB 160-405366/1-A	Method Blank	89							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32196-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	78		72 - 115
Tetrachloro-m-xylene	73		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32196-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L2N3
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	157		ug/Kg	☼	87	23 - 140
Aroclor 1260	11	U	181	166		ug/Kg	☼	92	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	78		23 - 146

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	181	153		ug/Kg	☼	85	23 - 140	2	30
Aroclor 1260	11	U	181	157		ug/Kg	☼	87	20 - 131	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*74*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406546/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1	U	8.5	2.1	mg/Kg		12/19/18 10:23	12/27/18 17:09	1
Lithium	1.3	U	4.2	1.3	mg/Kg		12/19/18 10:23	12/27/18 17:09	1

Lab Sample ID: LCS 160-406546/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.70	9.79		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-406546/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.74	D	mg/Kg		87.1	53.5 - 124.5

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U N D	19.5	7.22	B N D	mg/Kg	☼	37	75 - 125
Lithium	8.6	B D	9.73	19.42	D	mg/Kg	☼	111	75 - 125

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U N D	18.2	7.06	B D N	mg/Kg	☼	39	75 - 125	2	30
Lithium	8.6	B D	9.12	19.34	D	mg/Kg	☼	118	75 - 125	0	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32196-1	B3L2N3	91
160-32196-1 MS	B3L2N3	78
160-32196-1 MSD	B3L2N3	74
160-32196-2	B3L2L5	72
160-32196-3	B3L2N9	72
160-32196-4	B3L2N6	74
160-32196-5	B3L2T0	78
160-32196-6	B3L2K3	87
160-32196-7	B3L2P2	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-405132/2-A	Lab Control Sample	93
MB 160-405132/1-A	Method Blank	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 28 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL466373, GEL466526

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL466373 and GEL466526 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L2R6	12/05/18	Soil	C	8151A
B3L2K5	12/05/18	Soil	C	8151A
B3L2P7	12/05/18	Soil	C	8151A
B3L2J9	12/05/18	Soil	C	8151A
B3L2R3	12/05/18	Soil	C	8151A
B3L2M0	12/05/18	Soil	C	8151A
B3L2J3	12/05/18	Soil	C	8151A
B3L2P4	12/05/18	Soil	C	8151A
B3L2K8	12/05/18	Soil	C	8151A
B3L2J6	12/05/18	Soil	C	8151A
B3L2R0	12/05/18	Soil	C	8151A
B3L2L1	12/05/18	Soil	C	8151A
B3L2M6	12/05/18	Soil	C	8151A
B3L2M9	12/05/18	Soil	C	8151A
B3L2M3	12/05/18	Soil	C	8151A
B3L2L7	12/05/18	Soil	C	8151A
B3L2T2	12/05/18	Soil	C	8151A
B3L2K2	12/06/18	Soil	C	8151A
B3L2L4	12/06/18	Soil	C	8151A
B3L2N2	12/06/18	Soil	C	8151A
B3L2N5	12/06/18	Soil	C	8151A
B3L2N8	12/06/18	Soil	C	8151A
B3L2P1	12/06/18	Soil	C	8151A
B3L2R9	12/06/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation

Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

SDG GEL466373

The 2,4-dichlorophenylacetic acid surrogate recovery for sample B3L2T2 on the primary column was below the lower acceptance limit but ≥10%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ."

The 2,4-dichlorophenylacetic acid surrogate recoveries for samples B3L2M6, B3L2K8MS, B3L2K8MSD, B3L332MS, and B3L332MSD were above the upper acceptance limit. All results for sample B3L2M6 were non-detects and should not be qualified as a result. Since samples B3L2K8MS, B3L2K8MSD, B3L332MS and B3L332MSD were QC samples, data should not be qualified as a result.

For SDG GEL466526, the 2,4-dichlorophenylacetic acid surrogate recoveries for samples B3L2R9, B3L2K8MS and B3L2K8MSD were above the upper acceptance limit. All results for sample B3L2R9 were non-detects and should not be qualified as a result. Since samples B3L2K8MS and B3L2K8MSD were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG GEL466373 (batch 1830395)
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for 2,4-DB, dalapon, MCPA and MCPP were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for dichlorprop were above the acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

SDG GEL466373 (batch 1831925 – two MS/MSD pairs were analyzed)
The MS and MSD recoveries for dinoseb for both pairs were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for dalapon for both pairs were below the lower acceptance limit but ≥20%. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for MCPA, MCPP and 2,4-D were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

SDG GEL466526

The MS and MSD recoveries for dinoseb were <20%. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples

The MS and MSD recoveries for 2,4-DB, dalapon, MCPA and MCPP were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for dichlorprop were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

SDG GEL466373, the LCS recovery for dalapon associated with batches 1830395 and 1831925 and dinoseb associated with batch 1831925 were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment all dalapon sample results should be qualified as estimates and flagged "UJ." All associated dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

SDG GEL466526, the LCS recovery for dalapon was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exceptions.

SDG GEL466373 (batch 1830395)
The RPDs for dinoseb and MCPA were above the upper acceptance limit. All associated sample results were non-detects, therefore, all MCPA sample results should be qualified as estimates and flagged "UJ" All dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recovery. See the table in Appendix 2 for a listing of affected samples

SDG GEL466373 (batch 1831925 – two MS/MSD pairs were analyzed)
The RPDs for dinoseb for both pairs and the RPDs for 2,4-D, MCPA and MCPP were above the upper acceptance limit. All associated sample results were non-detects, therefore, all 2,4-D, MCPA and MCPP sample results should be qualified as estimates and flagged "UJ." All dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466526, the RPDs for dinoseb and MCPA were above the upper acceptance limit. All associated sample results were non-detects, therefore all MCPA results should be qualified as estimates and flagged "UJ." All dinoseb results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL466373 and GEL466526 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 90%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification all dinoseb sample results as unusable were due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike recovery, low LCS recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Herbicide Data Qualification Summary			
SDGs: GEL466373, GEL466526	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4,5-T, 2,4,5-TP, 2,4-D, dicamba, dichlorprop	UJ	B3L2T2	Low surrogate recovery
2,4-DB, MCPP	UJ	B3L2T2	Low surrogate recovery and low matrix spike recoveries
MCPA	UJ	B3L2T2	Low surrogate recovery, low matrix spike recoveries and poor MS/MSD precision
dalapon	UJ	B3L2T2	Low surrogate recovery, low matrix spike recoveries and low LCS recovery
dinoseb	UR	B3L2T2	Low surrogate recovery, very low matrix spike recoveries and poor MS/MSD precision
dinoseb	UR	B3L2J3, B3L2P4, B3L2K8, B3L2J6, B3L2R0, B3L2L1, B3K2M6, B3L2M9, B3L2M3, B3L2L7, B3L2K2, B3L2L4, B3L2N2, B3L2N5, B3L2N8, B3L2P1, B3L2R9	Very low matrix spike recoveries and poor MS/MSD precision
dinoseb	UR	B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0	Very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
2,4-DB, MCPP	UJ	B3L2J3, B3L2P4, B3L2K8, B3L2J6, B3L2R0, B3L2L1, B3K2M6, B3L2M9, B3L2M3, B3L2L7, B3L2K2, B3L2L4, B3L2N2, B3L2N5,	Low matrix spike recoveries

		B3L2N8, B3L2P1, B3L2R9	
MCPP	UJ	B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0	Poor MS/MSD precision
MCPA	UJ	B3L2J3, B3L2P4, B3L2K8, B3L2J6, B3L2R0, B3L2L1, B3K2M6, B3L2M9, B3L2M3, B3L2L7, B3L2K2, B3L2L4, B3L2N2, B3L2N5, B3L2N8, B3L2P1, B3L2R9	Low matrix spike recoveries and poor MS/MSD precision
MCPA	UJ	B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0	Poor MS/MSD precision
dalapon	UJ	B3L2J3, B3L2P4, B3L2K8, B3L2J6, B3L2R0, B3L2L1, B3K2M6, B3L2M9, B3L2M3, B3L2L7, B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0, B3L2K2, B3L2L4, B3L2N2, B3L2N5, B3L2N8, B3L2P1, B3L2R9	Low matrix spike recoveries and low LCS recoveries
2,4-D	UJ	B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0	Poor MS/MSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/23/19	
			SDG: GEL466373, GEL466526		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX: Soil					
GEL466373: B3L2R6, B3L2K5, B3L2P7, B3L2J9, B3L2R3, B3L2M0, B3L2J3, B3L2P4, B3L2K8, B3L2J6, B3L2R0, B3L2L1, B3L2M6, B3L2M9, B3L2M3, B3L2L7, B3L2T2,					
GEL466526: B3L2K2, B3L2L4, B3L2N2, B3L2N5, B3L2N8, B3L2P1, B3L2R9					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

GEL466373: B3L2K8MS DCAA1 295%; B3L2K8MSD DCAA1 276%; B3L2M6 DCAA1 215%; B3L2T2 DCAA1 58%, B3L332MS DCAA1 693%, B3L332MSD DCAA11304%

GEL466526: B3L2K8MS DCAA1 295%, B3L2K8MSD DCAA1 276%; B3L2R9 DCAA1 141%

MS/MSD

GEL466373:

(batch1830395) 2,4-DB 64% (MS), dalapon 22%/24%, dichlorprop 171%/152%, dinoseb 0%/9%, MCPA 60% (MSD), MCPP 69%

(batch 1831925) 466524001 dalapon 53%/64%, dinoseb 5%/19%

466527006 dalapon 35%/38%, dinoseb 8%/13%, MCPA 196%/347%, MCPP 179%/325%, 2,4-D 361% (MSD)

GEL466526 2,4-DB 64% (MS), dalapon 22%/24%, dichlorprop 171%/152%, dinoseb 0%/9%, MCPA 60% (MSD), MCPP 69% (MSD)

LCS information on last page

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL466373 RPDs (batch 1830395) dinoseb 200%, MCPA 71%
(batch 1831925) 466524001 dinoseb 111%
466527006 2,4-D 119%, dinoseb 46%, MCPA 56%, MCPP 58%

GEL 466526 dinoseb 200%, MCPA 71%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

LCS

GEL466373 (batch 1830395) dalapon 40%,
(batch 1831925) dalapon 46%, dinoseb 55%

GEL466526 dalapon 40%

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL466373

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
466373024	B3L2J3	76	86
1204177454	MB for batch 1830395	70	87
1204177455	LCS for batch 1830395	110	99
466373025	B3L2P4	72	93
466373026	B3L2K8	73	93
1204182078	B3L2K8MS	295 *	92
1204182079	B3L2K8MSD	276 *	87
466373027	B3L2J6	73	90
466373028	B3L2R0	75	96
466373029	B3L2L1	72	94
466373030	B3L2M6	215 *	93
466373031	B3L2M9	68	91
466373032	B3L2M3	86	92
466373033	B3L2L7	58	80
466373034	B3L2T2	118	93
1204180685	MB for batch 1831924	79	98
1204180686	LCS for batch 1831924	94	90
466373018	B3L2R6	95	93
466373019	B3L2K5	85	95
466373020	B3L2P7	82	88
466373021	B3L2J9	76	91
466373022	B3L2R3	83	96
466373023	B3L2M0	74	95
1204180689	B3MMR2MS	109	91

DCAA = 2,4-Dichlorophenylacetic acid (37%-149%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

Herbicide

Surrogate Recovery Report

SDG Number: GEL466373

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204180690	B3MMR2MSD	95	89
1204183906	B3L332MS	693 *	85
1204183907	B3L332MSD	1304 *	102

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466373**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1830395										
QC1204177455 LCS										
2,4,5-T	39.9			37.9	ug/kg		95	(60%-139%)	LOF	12/19/18 12:08
2,4,5-TP	39.9			39.4	ug/kg		99	(62%-140%)		
2,4-D	39.9			35.9	ug/kg		90	(55%-140%)		
2,4-DB	39.9			39.4	ug/kg		99	(51%-152%)		
Dalapon	399			160	ug/kg		40	(32%-110%)		
Dicamba	39.9			38.6	ug/kg		97	(53%-135%)		
Dichlorprop	39.9			38.1	ug/kg		95	(52%-136%)		
Dinoseb	39.9			33.7	ug/kg		84	(24%-104%)		
MCPA	3990			3830	ug/kg		96	(44%-142%)		
MCPP	3990			3800	ug/kg		95	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			98.7	ug/kg		99	(37%-149%)		
QC1204177454 MB										
2,4,5-T			U	1.65	ug/kg					12/19/18 11:49
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830395											
2,4-D				U	1.65	ug/kg				LOF	12/19/18 11:49
2,4-DB				U	1.65	ug/kg					
Dalapon				U	34.8	ug/kg					
Dicamba				U	1.99	ug/kg					
Dichlorprop				U	2.25	ug/kg					
Dinoseb				U	1.65	ug/kg					
MCPA				U	229	ug/kg					
MCPP				U	199	ug/kg					
**2,4-Dichlorophenylacetic acid	99.5				69.4	ug/kg		70	(37%-149%)		
QC1204182078 466373026 MS											
2,4,5-T	42.6	U	1.76		35.3	ug/kg		83	(39%-144%)		12/19/18 13:25
2,4,5-TP	42.6	U	1.76		33.2	ug/kg		78	(40%-146%)		
2,4-D	42.6	U	1.76		30.4	ug/kg		71	(40%-149%)		
2,4-DB	42.6	U	1.76		27.2	ug/kg		64	(29%-160%)		
Dalapon	426	U	37.1	J	95.7	ug/kg		22	(19%-132%)		
Dicamba	42.6	U	2.12		34.9	ug/kg		82	(46%-135%)		

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830395											
Dichlorprop	42.6	TU	2.40	PT	72.7	ug/kg		171*	(38%-145%)	LOF	12/19/18 13:25
Dinoseb	42.6	TU	1.76	TU	1.77	ug/kg		0*	(20%-118%)		
MCPA	4260	U	244		5330	ug/kg		125	(29%-154%)		
MCPP	4260	U	212		3360	ug/kg		79	(30%-135%)		
**2,4-Dichlorophenylacetic acid	106		77.2		314	ug/kg		295*	(37%-149%)		
QC1204182079 466373026 MSD											
2,4,5-T	42.4	U	1.76		30.3	ug/kg	15	71	(0%-30%)		12/19/18 13:53
2,4,5-TP	42.4	U	1.76		33.0	ug/kg	1	78	(0%-30%)		
2,4-D	42.4	U	1.76		29.9	ug/kg	2	70	(0%-30%)		
2,4-DB	42.4	U	1.76		33.0	ug/kg	19	78	(0%-30%)		
Dalapon	424	U	37.1	J	104	ug/kg	8	24	(0%-30%)		
Dicamba	42.4	U	2.12		35.2	ug/kg	1	83	(0%-30%)		
Dichlorprop	42.4	TU	2.40	PT	64.3	ug/kg	12	152*	(0%-30%)		
Dinoseb	42.4	TU	1.76	JPT	3.66	ug/kg	200*	9*	(0%-30%)		
MCPA	4240	U	244		2530	ug/kg	71*	60	(0%-30%)		
MCPP	4240	U	212		2920	ug/kg	14	69	(0%-30%)		

QC Summary

Workorder: **466373**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1830395										
**2,4-Dichlorophenylacetic acid	106	77.2		292	ug/kg		276*	(37%-149%)	LOF	12/19/18 13:53
Batch 1831925										
QC1204180686 LCS										
2,4,5-T	39.9			34.8	ug/kg		87	(60%-139%)	LOF	12/20/18 16:55
2,4,5-TP	39.9			37.2	ug/kg		93	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			37.1	ug/kg		93	(51%-152%)		
Dalapon	399			183	ug/kg		46	(32%-110%)		
Dicamba	39.9			33.9	ug/kg		85	(53%-135%)		
Dichlorprop	39.9			32.3	ug/kg		81	(52%-136%)		
Dinoseb	39.9			22.0	ug/kg		55	(24%-104%)		
MCPA	3990			2880	ug/kg		72	(44%-142%)		
MCPP	3990			3010	ug/kg		75	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.7			89.7	ug/kg		90	(37%-149%)		
QC1204180685 MB										
2,4,5-T			U	1.65	ug/kg					12/20/18 16:35
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1831925												
2,4-D				U	1.65	ug/kg				LOF	12/20/18	16:35
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.5				78.6	ug/kg		79	(37%-149%)			
QC1204180689 466524001 MS												
2,4,5-T	39.9	U	1.65		38.3	ug/kg		96	(39%-144%)		12/20/18	22:30
2,4,5-TP	39.9	U	1.65		39.4	ug/kg		99	(40%-146%)			
2,4-D	39.9	U	1.65		35.4	ug/kg		89	(40%-149%)			
2,4-DB	39.9	U	1.65		46.3	ug/kg		116	(29%-160%)			
Dalapon	399	U	34.8		210	ug/kg		53	(19%-132%)			
Dicamba	39.9	U	1.99		38.9	ug/kg		98	(46%-135%)			

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831925											
Dichlorprop	39.9	U	2.25		37.8	ug/kg		95	(38%-145%)	LOF	12/20/18 22:30
Dinoseb	39.9	TU	1.65	JT	2.15	ug/kg		5*	(20%-118%)		
MCPA	3990	U	228		3430	ug/kg		86	(29%-154%)		
MCPP	3990	U	199		3370	ug/kg		85	(30%-135%)		
**2,4-Dichlorophenylacetic acid	99.7		84.3		109	ug/kg		109	(37%-149%)		
QC1204183906 466527006 MS											
2,4,5-T	41.7	U	1.75		30.7	ug/kg		74	(39%-144%)		12/21/18 02:58
2,4,5-TP	41.7	U	1.75		30.1	ug/kg		72	(40%-146%)		
2,4-D	41.7	TU	1.75		38.7	ug/kg		93	(40%-149%)		
2,4-DB	41.7	U	1.75		31.2	ug/kg		75	(29%-160%)		
Dalapon	417	U	36.8		144	ug/kg		35	(19%-132%)		
Dicamba	41.7	U	2.10		36.9	ug/kg		89	(46%-135%)		
Dichlorprop	41.7	U	2.38		31.6	ug/kg		76	(38%-145%)		
Dinoseb	41.7	TU	1.75	JT	3.40	ug/kg		8*	(20%-118%)		
MCPA	4170	TU	242	PT	8190	ug/kg		196*	(29%-154%)		
MCPP	4170	TU	210	PT	7490	ug/kg		179*	(30%-135%)		

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831925											
**2,4-Dichlorophenylacetic acid	104		83.8		89.0	ug/kg		85	(37%-149%)	LOF	12/21/18 02:58
QC1204180690 466524001 MSD											
2,4,5-T	39.8	U	1.65		37.1	ug/kg	3	93	(0%-30%)		12/20/18 22:59
2,4,5-TP	39.8	U	1.65		39.4	ug/kg	0	99	(0%-30%)		
2,4-D	39.8	U	1.65		38.4	ug/kg	8	96	(0%-30%)		
2,4-DB	39.8	U	1.65		44.8	ug/kg	3	113	(0%-30%)		
Dalapon	398	U	34.8		257	ug/kg	20	64	(0%-30%)		
Dicamba	39.8	U	1.99		38.8	ug/kg	0	97	(0%-30%)		
Dichlorprop	39.8	U	2.25		36.1	ug/kg	5	91	(0%-30%)		
Dinoseb	39.8	TU	1.65	T	7.55	ug/kg	111*	19*	(0%-30%)		
MCPA	3980	U	228		3550	ug/kg	3	89	(0%-30%)		
MCPP	3980	U	199		3780	ug/kg	11	95	(0%-30%)		
**2,4-Dichlorophenylacetic acid	99.5		84.3		94.6	ug/kg		95	(37%-149%)		
QC1204183907 466527006 MSD											
2,4,5-T	41.9	U	1.75		35.0	ug/kg	13	84	(0%-30%)		12/21/18 03:26
2,4,5-TP	41.9	U	1.75		32.6	ug/kg	8	78	(0%-30%)		

QC Summary

Workorder: **466373**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831925											
2,4-D	41.9	TU	1.75	EPT	151	ug/kg	119*	361*	(0%-30%)	LOF	12/21/18 03:26
2,4-DB	41.9	U	1.75		31.1	ug/kg	0	74	(0%-30%)		
Dalapon	419	U	36.8		158	ug/kg	9	38	(0%-30%)		
Dicamba	41.9	U	2.10	P	42.1	ug/kg	13	101	(0%-30%)		
Dichlorprop	41.9	U	2.38	P	41.4	ug/kg	27	99	(0%-30%)		
Dinoseb	41.9	TU	1.75	PT	5.41	ug/kg	46*	13*	(0%-30%)		
MCPA	4190	TU	242	EPT	14500	ug/kg	56*	347*	(0%-30%)		
MCPP	4190	TU	210	EPT	13600	ug/kg	58*	325*	(0%-30%)		
**2,4-Dichlorophenylacetic acid	105		83.8		107	ug/kg		102	(37%-149%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Herbicide

Surrogate Recovery Report

SDG Number: GEL466526

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204177454	MB for batch 1830394	70	87
1204177455	LCS for batch 1830394	110	99
1204182078	B3L2K8MS	295 *	92
1204182079	B3L2K8MSD	276 *	87
466526001	B3L2K2	80	94
466526002	B3L2L4	75	87
466526003	B3L2N2	72	91
466526004	B3L2N5	87	85
466526005	B3L2N8	69	89
466526006	B3L2P1	126	94
466526007	B3L2R9	141	91

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

QC Summary

Report Date: December 20, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466526**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1830395										
QC1204177455 LCS										
2,4,5-T	39.9			37.9	ug/kg		95	(60%-139%)	LOF	12/19/18 12:08
2,4,5-TP	39.9			39.4	ug/kg		99	(62%-140%)		
2,4-D	39.9			35.9	ug/kg		90	(55%-140%)		
2,4-DB	39.9			39.4	ug/kg		99	(51%-152%)		
Dalapon	399			160	ug/kg		40	(32%-110%)		
Dicamba	39.9			38.6	ug/kg		97	(53%-135%)		
Dichlorprop	39.9			38.1	ug/kg		95	(52%-136%)		
Dinoseb	39.9			33.7	ug/kg		84	(24%-104%)		
MCPA	3990			3830	ug/kg		96	(44%-142%)		
MCPP	3990			3800	ug/kg		95	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			98.7	ug/kg		99	(37%-149%)		
QC1204177454 MB										
2,4,5-T			U	1.65	ug/kg					12/19/18 11:49
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466526**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1830395												
2,4-D				U	1.65	ug/kg				LOF	12/19/18	11:49
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.5				69.4	ug/kg		70	(37%-149%)			
QC1204182078 466373026 MS												
2,4,5-T	42.6	U	1.76		35.3	ug/kg		83	(39%-144%)		12/19/18	13:25
2,4,5-TP	42.6	U	1.76		33.2	ug/kg		78	(40%-146%)			
2,4-D	42.6	U	1.76		30.4	ug/kg		71	(40%-149%)			
2,4-DB	42.6	U	1.76		27.2	ug/kg		64	(29%-160%)			
Dalapon	426	U	37.1	J	95.7	ug/kg		22	(19%-132%)			
Dicamba	42.6	U	2.12		34.9	ug/kg		82	(46%-135%)			

QC Summary

Workorder: **466526**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830395											
Dichlorprop	42.6	TU	2.40	PT	72.7	ug/kg		171*	(38%-145%)	LOF	12/19/18 13:25
Dinoseb	42.6	TU	1.76	TU	1.77	ug/kg		0*	(20%-118%)		
MCPA	4260	U	244		5330	ug/kg		125	(29%-154%)		
MCPP	4260	U	212		3360	ug/kg		79	(30%-135%)		
**2,4-Dichlorophenylacetic acid	106		77.2		314	ug/kg		295*	(37%-149%)		
QC1204182079 466373026 MSD											
2,4,5-T	42.4	U	1.76		30.3	ug/kg	15	71	(0%-30%)		12/19/18 13:53
2,4,5-TP	42.4	U	1.76		33.0	ug/kg	1	78	(0%-30%)		
2,4-D	42.4	U	1.76		29.9	ug/kg	2	70	(0%-30%)		
2,4-DB	42.4	U	1.76		33.0	ug/kg	19	78	(0%-30%)		
Dalapon	424	U	37.1	J	104	ug/kg	8	24	(0%-30%)		
Dicamba	42.4	U	2.12		35.2	ug/kg	1	83	(0%-30%)		
Dichlorprop	42.4	TU	2.40	PT	64.3	ug/kg	12	152*	(0%-30%)		
Dinoseb	42.4	TU	1.76	JPT	3.66	ug/kg	200*	9*	(0%-30%)		
MCPA	4240	U	244		2530	ug/kg	71*	60	(0%-30%)		
MCPP	4240	U	212		2920	ug/kg	14	69	(0%-30%)		

QC Summary

Workorder: **466526**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830395											
**2,4-Dichlorophenylacetic acid	106	77.2		292	ug/kg		276*	(37%-149%)	LOF	12/19/18	13:53

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Groups (SDGs) SL32166-1, SL32168-1, SL32196-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32166-1, SL32168-1 and SL32196-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2J4	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2P8	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2M1	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2K9	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2J7	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2K6	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2M4	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2R7	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2P5	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2R4	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2R1	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2T3	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2L2	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2N0	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2M7	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2K0	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2L8	12/05/18	Soil	C	6010D, 6020B, 7471B
B3L2N3	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2L5	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2N9	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2N6	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2T0	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2K3	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2P2	12/06/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation

Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG SL32166-1

The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. The B results for samples B3L2J4 and B3L2P8 were non-detects and should be qualified as estimates and flagged "UJ."

The MS and MSD recoveries for Mn and Al were above the upper acceptance limit. The Mn results for samples B3L2J4 and B3L2P8 were detects and should be qualified as estimates and flagged "J+." The Al parent sample result was >4X the spike concentration and should not be qualified as a result.

SDG SL32168-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit. All associated Mn sample results were detects and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected samples. The Al parent sample result was >4X the spike concentration and should not be qualified as a result.

SDG SL32196-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al were above the upper acceptance limit. The parent sample result was >4X the spike concentration and data should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

- **Completeness**

SDGs SL32166-1, SL32168-1 and SL32196-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of B and Mn sample results as estimates were due to matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Metals Data Qualification Summary			
SDGs: SL32166-1, SL32168-1, SL32196-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
B	UJ	B3L2J4, B3L2P8, B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8, B3L2N3, B3L2L5, B3L2N9, B3L2N6, B3L2T0, B3L2K3, B3L2P2	Low matrix spike recoveries
Mn	J+	B3L2J4, B3L2P8, B3L2M1, B3L2K9, B3L2J7, B3L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-014		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/23/19	
			SDG: SL32166-1, SL32168-1, SL32196-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SL32166-1: B3L2J4, B3L2P8					
SL32168-1: B3L2M1, B3L2K9, B3L2J7, B34L2K6, B3L2M4, B3L2R7, B3L2P5, B3L2R4, B3L2R1, B3L2T3, B3L2L2, B3L2N0, B3L2M7, B3L2K0, B3L2L8					
SL32196-1: B3L2N3, B3L2L5, B3L2N9, B3L2N6, B3L2T0, B3L2K3, B3L2P2					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
ICP interference checks acceptable?	Yes No N/A
ICV and CCV checks performed on all instruments?	Yes No N/A
ICV and CCV checks acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No N/A
ICB and CCB results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field blanks analyzed? (Levels C, D, E)	Yes No N/A
Field blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL32166-1: B 37%/40%, Al 298%/293%, Mn 165%/167% (Al parent result >4X spike)

SL32168-1: B 43%/48%, Al 306%/292%, Mn 180%/180% (Al parent result >4X spike)

SL32196-1: B 37%/39%, Al 248%/284%, (Al parent result >4X spike)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No N/A
ICP serial dilution %D values acceptable?	Yes No N/A
ICP post digestion spike required?	Yes No N/A
ICP post digestion spike values acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*79*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406155/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:23	12/19/18 18:02	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:23	12/19/18 18:02	1

Lab Sample ID: LCS 160-406155/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.30	9.01		mg/Kg		97	80 - 120

Lab Sample ID: LCSSRM 160-406155/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.03	D	mg/Kg		81.9	53.5 - 124.5

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U D N	19.6	7.20	B D N	mg/Kg	☼	37	75 - 125
Lithium	6.2	B D	9.78	16.75	D	mg/Kg	☼	107	75 - 125

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U D N	20.7	8.29	B D N	mg/Kg	☼	40	75 - 125	14	30
Lithium	6.2	B D	10.4	17.95	D	mg/Kg	☼	113	75 - 125	7	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406150/1-A
Matrix: Solid
Analysis Batch: 407531

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406150

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.8	U D	4.5	1.8	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Arsenic	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Barium	0.45	U D	1.8	0.45	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Beryllium	0.036	U D	0.090	0.036	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Cadmium	0.022	U D	0.045	0.022	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Chromium	0.40	U D	0.90	0.40	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Cobalt	0.067	U D	0.18	0.067	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Copper	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Lead	0.11	U D	0.27	0.11	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Manganese	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Molybdenum	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Nickel	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Selenium	0.29	U D	0.45	0.29	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Silver	0.067	U D	0.18	0.067	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Strontium	0.22	U D	0.45	0.22	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Tin	0.081	U D	0.18	0.081	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Uranium	0.036	U D	0.090	0.036	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Vanadium	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Zinc	1.8	U D	4.5	1.8	mg/Kg		12/17/18 11:07	12/24/18 14:04	2

Lab Sample ID: LCS 160-406150/2-A
Matrix: Solid
Analysis Batch: 407531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	93.0	97.89	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-406150/3-A
Matrix: Solid
Analysis Batch: 407531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8438	D	mg/Kg		100.9	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	283.6	D	mg/Kg		109.1	75.0 - 125.0
Beryllium	97.6	110.7	D	mg/Kg		113.4	75.0 - 125.0
Cadmium	211	230.3	D	mg/Kg		109.1	74.9 - 125.1
Chromium	136	155.4	D	mg/Kg		114.3	70.0 - 130.1
Cobalt	48.2	55.87	D	mg/Kg		115.9	74.9 - 124.9
Copper	166	193.9	D	mg/Kg		116.8	74.7 - 124.7
Lead	111	124.0	D	mg/Kg		111.7	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406150/3-A
Matrix: Solid
Analysis Batch: 407531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	252.2	D	mg/Kg		87.6	57.3 - 101.0
Molybdenum	110	125.0	D	mg/Kg		113.6	70.5 - 129.1
Nickel	91.9	106.2	D	mg/Kg		115.5	70.0 - 129.5
Selenium	191	216.9	D	mg/Kg		113.6	68.6 - 131.9
Silver	43.3	48.81	D	mg/Kg		112.7	69.5 - 130.5
Strontium	107	119.8	D	mg/Kg		112.0	72.1 - 128.0
Tin	99.9	114.7	D	mg/Kg		114.8	56.8 - 143.1
Vanadium	56.7	65.70	D	mg/Kg		115.9	56.8 - 143.4
Zinc	199	225.5	D	mg/Kg		113.3	69.8 - 130.2

Lab Sample ID: 160-32166-19 MS
Matrix: Soil
Analysis Batch: 407531

Client Sample ID: B3L2J4
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6080	D	978	8997	D X	mg/Kg	☼	298	75 - 125
Arsenic	3.0	D	97.8	100.9	D	mg/Kg	☼	100	75 - 125
Barium	71.3	D	97.8	184.2	D	mg/Kg	☼	115	75 - 125
Beryllium	0.30	D	9.78	11.27	D	mg/Kg	☼	112	75 - 125
Cadmium	0.098	D	97.8	98.59	D	mg/Kg	☼	101	75 - 125
Chromium	10.2	D	97.8	98.00	D	mg/Kg	☼	90	75 - 125
Cobalt	9.1	D	97.8	106.6	D	mg/Kg	☼	100	75 - 125
Copper	12.9	D	97.8	108.7	D	mg/Kg	☼	98	75 - 125
Lead	5.0	D	97.8	106.7	D	mg/Kg	☼	104	75 - 125
Manganese	342	D N	97.8	502.9	D N	mg/Kg	☼	165	75 - 125
Molybdenum	0.36	B D	48.9	50.79	D	mg/Kg	☼	103	75 - 125
Nickel	11.3	D	97.8	110.0	D	mg/Kg	☼	101	75 - 125
Selenium	2.1	D	48.9	47.71	D	mg/Kg	☼	93	75 - 125
Silver	0.075	U D	19.6	19.92	D	mg/Kg	☼	102	75 - 125
Strontium	17.4	D	97.8	128.3	D	mg/Kg	☼	113	75 - 125
Tin	0.46	D	97.8	99.45	D	mg/Kg	☼	101	75 - 125
Uranium	0.41	D	97.8	104.8	D	mg/Kg	☼	107	75 - 125
Vanadium	61.5	D	97.8	151.7	D	mg/Kg	☼	92	75 - 125
Zinc	48.6	D	97.8	144.8	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-32166-19 MSD
Matrix: Soil
Analysis Batch: 407531

Client Sample ID: B3L2J4
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6080	D	1040	9113	D X	mg/Kg	☼	293	75 - 125	1	30
Arsenic	3.0	D	104	106.2	D	mg/Kg	☼	100	75 - 125	5	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407531 — **Prep Batch: 406150**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	71.3	D	104	190.1	D	mg/Kg	☼	115	75 - 125	3	30
Beryllium	0.30	D	10.4	11.79	D	mg/Kg	☼	111	75 - 125	5	30
Cadmium	0.098	D	104	103.2	D	mg/Kg	☼	99	75 - 125	5	30
Chromium	10.2	D	104	102.8	D	mg/Kg	☼	89	75 - 125	5	30
Cobalt	9.1	D	104	113.4	D	mg/Kg	☼	101	75 - 125	6	30
Copper	12.9	D	104	116.2	D	mg/Kg	☼	100	75 - 125	7	30
Lead	5.0	D	104	110.6	D	mg/Kg	☼	102	75 - 125	4	30
Manganese	342	D N	104	514.7	D N	mg/Kg	☼	167	75 - 125	2	30
Molybdenum	0.36	B D	51.8	53.53	D	mg/Kg	☼	103	75 - 125	5	30
Nickel	11.3	D	104	116.8	D	mg/Kg	☼	102	75 - 125	6	30
Selenium	2.1	D	51.8	51.28	D	mg/Kg	☼	95	75 - 125	7	30
Silver	0.075	U D	20.7	20.40	D	mg/Kg	☼	98	75 - 125	2	30
Strontium	17.4	D	104	141.6	D	mg/Kg	☼	120	75 - 125	10	30
Tin	0.46	D	104	104.1	D	mg/Kg	☼	100	75 - 125	5	30
Uranium	0.41	D	104	108.6	D	mg/Kg	☼	104	75 - 125	4	30
Vanadium	61.5	D	104	157.2	D	mg/Kg	☼	92	75 - 125	4	30
Zinc	48.6	D	104	152.4	D	mg/Kg	☼	100	75 - 125	5	30

Lab Sample ID: MB 160-406156/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		12/17/18 11:24	01/02/19 15:05	2

Lab Sample ID: LCS 160-406156/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	47.8	47.29	D	mg/Kg		99	21 - 251

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.48	U D	54.1	53.32	D	mg/Kg	☼	99	75 - 125

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.48	U D	52.1	51.23	D	mg/Kg	☼	98	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32166-1
SDG: SL32166-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406534/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406760 — **Prep Batch: 406534**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.013	U	0.038	0.013	mg/Kg		12/19/18 09:10	12/19/18 14:49	1

Lab Sample ID: LCSSRM 160-406534/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406760 — **Prep Batch: 406534**

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	10.91	D	mg/Kg		94.8	59.7 - 139.1		

Lab Sample ID: 160-32166-19 MS — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406760 — **Prep Batch: 406534**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.014	U	1.03	1.05		mg/Kg	☼	102	80 - 120		

Lab Sample ID: 160-32166-19 MSD — **Client Sample ID: B3L2J4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406760 — **Prep Batch: 406534**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.014	U	0.991	1.00		mg/Kg	☼	101	80 - 120	5	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-405366/2-A
Matrix: Solid
Analysis Batch: 406501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405366

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*23 - 146*

Lab Sample ID: 160-32168-1 MS
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	176	166		ug/Kg	☼	94	23 - 140
Aroclor 1260	11	U	176	173		ug/Kg	☼	98	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Lab Sample ID: 160-32168-1 MSD
Matrix: Soil
Analysis Batch: 406501

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 405366

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	176	153		ug/Kg	☼	87	23 - 140	9	30
Aroclor 1260	11	U	176	155		ug/Kg	☼	88	20 - 131	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*80*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406155/1-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406155

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	9.0	2.2	mg/Kg		12/17/18 11:23	12/19/18 18:02	1
Lithium	1.3	U	4.5	1.3	mg/Kg		12/17/18 11:23	12/19/18 18:02	1

Lab Sample ID: LCS 160-406155/2-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406155

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.30	9.01		mg/Kg		97	80 - 120

Lab Sample ID: LCSSRM 160-406155/3-A
Matrix: Solid
Analysis Batch: 406803

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406155

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.03	D	mg/Kg		81.9	53.5 - 124.5

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32168-1
SDG: SL32168-1

Lab Sample ID: 160-32168-1 MS — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.0	U D N	19.8	8.42	B D N	mg/Kg	☼	43	75 - 125
Lithium	7.3	B D	9.88	17.55	D	mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-32168-1 MSD — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406155**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.0	U D N	20.6	9.79	B D N	mg/Kg	☼	48	75 - 125	15	30
Lithium	7.3	B D	10.3	18.71	D	mg/Kg	☼	111	75 - 125	6	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406150/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407531 — **Prep Batch: 406150**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.8	U D	4.5	1.8	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Arsenic	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Barium	0.45	U D	1.8	0.45	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Beryllium	0.036	U D	0.090	0.036	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Cadmium	0.022	U D	0.045	0.022	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Chromium	0.40	U D	0.90	0.40	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Cobalt	0.067	U D	0.18	0.067	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Copper	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Lead	0.11	U D	0.27	0.11	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Manganese	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Molybdenum	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Nickel	0.18	U D	0.45	0.18	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Selenium	0.29	U D	0.45	0.29	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Silver	0.067	U D	0.18	0.067	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Strontium	0.22	U D	0.45	0.22	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Tin	0.081	U D	0.18	0.081	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Uranium	0.036	U D	0.090	0.036	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Vanadium	0.36	U D	0.90	0.36	mg/Kg		12/17/18 11:07	12/24/18 14:04	2
Zinc	1.8	U D	4.5	1.8	mg/Kg		12/17/18 11:07	12/24/18 14:04	2

Lab Sample ID: LCS 160-406150/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407531 — **Prep Batch: 406150**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	93.0	97.89	D	mg/Kg		105	80 - 120

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406150/3-A
Matrix: Solid
Analysis Batch: 407531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8438	D	mg/Kg		100.9	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	283.6	D	mg/Kg		109.1	75.0 - 125.0
Beryllium	97.6	110.7	D	mg/Kg		113.4	75.0 - 125.0
Cadmium	211	230.3	D	mg/Kg		109.1	74.9 - 125.1
Chromium	136	155.4	D	mg/Kg		114.3	70.0 - 130.1
Cobalt	48.2	55.87	D	mg/Kg		115.9	74.9 - 124.9
Copper	166	193.9	D	mg/Kg		116.8	74.7 - 124.7
Lead	111	124.0	D	mg/Kg		111.7	71.0 - 128.8
Manganese	288	252.2	D	mg/Kg		87.6	57.3 - 101.0
Molybdenum	110	125.0	D	mg/Kg		113.6	70.5 - 129.1
Nickel	91.9	106.2	D	mg/Kg		115.5	70.0 - 129.5
Selenium	191	216.9	D	mg/Kg		113.6	68.6 - 131.9
Silver	43.3	48.81	D	mg/Kg		112.7	69.5 - 130.5
Strontium	107	119.8	D	mg/Kg		112.0	72.1 - 128.0
Tin	99.9	114.7	D	mg/Kg		114.8	56.8 - 143.1
Vanadium	56.7	65.70	D	mg/Kg		115.9	56.8 - 143.4
Zinc	199	225.5	D	mg/Kg		113.3	69.8 - 130.2

Lab Sample ID: 160-32168-1 MS
Matrix: Soil
Analysis Batch: 407531

Client Sample ID: B3L2M1
Prep Type: Total/NA
Prep Batch: 406150

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6660	D	988	9686	D X	mg/Kg	☼	306	75 - 125
Arsenic	3.1	D	98.8	106.1	D	mg/Kg	☼	104	75 - 125
Barium	76.1	D	98.8	189.7	D	mg/Kg	☼	115	75 - 125
Beryllium	0.33	D	9.88	11.26	D	mg/Kg	☼	111	75 - 125
Cadmium	0.13	D	98.8	99.32	D	mg/Kg	☼	100	75 - 125
Chromium	11.6	D	98.8	102.5	D	mg/Kg	☼	92	75 - 125
Cobalt	8.6	D	98.8	110.8	D	mg/Kg	☼	103	75 - 125
Copper	13.0	D	98.8	114.3	D	mg/Kg	☼	102	75 - 125
Lead	8.2	D	98.8	110.0	D	mg/Kg	☼	103	75 - 125
Manganese	349	D N	98.8	526.6	D N	mg/Kg	☼	180	75 - 125
Molybdenum	0.38	B D	49.4	51.44	D	mg/Kg	☼	103	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32168-1 MS — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407531 — **Prep Batch: 406150**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	12.5	D	98.8	113.4	D	mg/Kg	☼	102	75 - 125
Selenium	2.0	D	49.4	50.12	D	mg/Kg	☼	97	75 - 125
Silver	0.076	U D	19.8	20.04	D	mg/Kg	☼	101	75 - 125
Strontium	26.0	D	98.8	137.7	D	mg/Kg	☼	113	75 - 125
Tin	0.48	D	98.8	100.2	D	mg/Kg	☼	101	75 - 125
Uranium	0.47	D	98.8	104.0	D	mg/Kg	☼	105	75 - 125
Vanadium	55.1	D	98.8	155.1	D	mg/Kg	☼	101	75 - 125
Zinc	52.6	D	98.8	157.9	D	mg/Kg	☼	107	75 - 125

Lab Sample ID: 160-32168-1 MSD — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407531 — **Prep Batch: 406150**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6660	D	1030	9674	D X	mg/Kg	☼	292	75 - 125	0	30
Arsenic	3.1	D	103	107.3	D	mg/Kg	☼	101	75 - 125	1	30
Barium	76.1	D	103	178.8	D	mg/Kg	☼	100	75 - 125	6	30
Beryllium	0.33	D	10.3	11.32	D	mg/Kg	☼	107	75 - 125	0	30
Cadmium	0.13	D	103	97.56	D	mg/Kg	☼	95	75 - 125	2	30
Chromium	11.6	D	103	103.4	D	mg/Kg	☼	89	75 - 125	1	30
Cobalt	8.6	D	103	113.7	D	mg/Kg	☼	102	75 - 125	3	30
Copper	13.0	D	103	116.9	D	mg/Kg	☼	101	75 - 125	2	30
Lead	8.2	D	103	105.4	D	mg/Kg	☼	94	75 - 125	4	30
Manganese	349	D N	103	534.1	D N	mg/Kg	☼	180	75 - 125	1	30
Molybdenum	0.38	B D	51.5	50.45	D	mg/Kg	☼	97	75 - 125	2	30
Nickel	12.5	D	103	116.4	D	mg/Kg	☼	101	75 - 125	3	30
Selenium	2.0	D	51.5	50.59	D	mg/Kg	☼	94	75 - 125	1	30
Silver	0.076	U D	20.6	19.58	D	mg/Kg	☼	95	75 - 125	2	30
Strontium	26.0	D	103	132.1	D	mg/Kg	☼	103	75 - 125	4	30
Tin	0.48	D	103	97.31	D	mg/Kg	☼	94	75 - 125	3	30
Uranium	0.47	D	103	102.0	D	mg/Kg	☼	99	75 - 125	2	30
Vanadium	55.1	D	103	152.9	D	mg/Kg	☼	95	75 - 125	1	30
Zinc	52.6	D	103	156.8	D	mg/Kg	☼	101	75 - 125	1	30

Lab Sample ID: MB 160-406156/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		12/17/18 11:24	01/02/19 15:05	2

Lab Sample ID: LCS 160-406156/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	47.8	47.29	D	mg/Kg		99	21 - 251

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32168-1 MS — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.51	U D	50.0	49.64	D	mg/Kg	☼	99	75 - 125

Lab Sample ID: 160-32168-1 MSD — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408696 — **Prep Batch: 406156**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.51	U D	45.3	43.97	D	mg/Kg	☼	97	75 - 125	12	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406521/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406748 — **Prep Batch: 406521**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.011	U	0.034	0.011	mg/Kg		12/19/18 07:35	12/19/18 12:53	1

Lab Sample ID: LCSSRM 160-406521/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406748 — **Prep Batch: 406521**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.58	D	mg/Kg		92.0	59.7 - 139.1

Lab Sample ID: 160-32168-1 MS — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406748 — **Prep Batch: 406521**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	1.03	1.02		mg/Kg	☼	99	80 - 120

Lab Sample ID: 160-32168-1 MSD — **Client Sample ID: B3L2M1**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406748 — **Prep Batch: 406521**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.02	1.00		mg/Kg	☼	98	80 - 120	2	30

Lab Sample ID: MB 160-406534/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406760 — **Prep Batch: 406534**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.013	U	0.038	0.013	mg/Kg		12/19/18 09:10	12/19/18 14:49	1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: LCSSRM 160-406534/2-A ^10
Matrix: Solid
Analysis Batch: 406760

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406534

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	10.91	D	mg/Kg		94.8	59.7 - 139.1		

Lab Sample ID: 160-32168-7 MS
Matrix: Soil
Analysis Batch: 406760

Client Sample ID: B3L2P5
Prep Type: Total/NA
Prep Batch: 406534

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.013	U	1.07	1.09		mg/Kg	☼	102	80 - 120		

Lab Sample ID: 160-32168-7 MSD
Matrix: Soil
Analysis Batch: 406760

Client Sample ID: B3L2P5
Prep Type: Total/NA
Prep Batch: 406534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.05	1.06		mg/Kg	☼	102	80 - 120	2	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	181	153		ug/Kg	☼	85	23 - 140	2	30
Aroclor 1260	11	U	181	157		ug/Kg	☼	87	20 - 131	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*74*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406546/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1	U	8.5	2.1	mg/Kg		12/19/18 10:23	12/27/18 17:09	1
Lithium	1.3	U	4.2	1.3	mg/Kg		12/19/18 10:23	12/27/18 17:09	1

Lab Sample ID: LCS 160-406546/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.70	9.79		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-406546/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.74	D	mg/Kg		87.1	53.5 - 124.5

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.9	U N D	19.5	7.22	B N D	mg/Kg	☼	37	75 - 125
Lithium	8.6	B D	9.73	19.42	D	mg/Kg	☼	111	75 - 125

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.9	U N D	18.2	7.06	B D N	mg/Kg	☼	39	75 - 125	2	30
Lithium	8.6	B D	9.12	19.34	D	mg/Kg	☼	118	75 - 125	0	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-049

TestAmerica Job ID: 160-32196-1
SDG: SL32196-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406542/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		12/19/18 10:14	01/03/19 12:06	2

Lab Sample ID: LCS 160-406542/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	48.5	46.69	D	mg/Kg		96	21 - 251

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.52	U D	54.6	52.71	D	mg/Kg	☼	97	75 - 125

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.52	U D	48.5	47.28	D	mg/Kg	☼	97	75 - 125	11	30

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.7	U D	4.2	1.7	mg/Kg		12/19/18 10:21	12/28/18 18:48	2
Chromium	0.38	U D	0.85	0.38	mg/Kg		12/19/18 10:21	12/28/18 18:48	2

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Barium	0.42	U D	1.7	0.42	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Beryllium	0.034	U D	0.085	0.034	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Cadmium	0.020	U D	0.042	0.020	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Cobalt	0.063	U D	0.17	0.063	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Copper	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Lead	0.11	U D	0.25	0.11	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Manganese	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Molybdenum	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Nickel	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Selenium	0.27	U D	0.42	0.27	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Silver	0.063	U D	0.17	0.063	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Strontium	0.20	U D	0.42	0.20	mg/Kg		12/19/18 10:21	12/31/18 16:39	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.076	U D	0.17	0.076	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Uranium	0.034	U D	0.085	0.034	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Vanadium	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Zinc	1.7	U D	4.2	1.7	mg/Kg		12/19/18 10:21	12/31/18 16:39	2

Lab Sample ID: LCS 160-406545/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	86.9	90.60	D	mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-406545/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7522	D	mg/Kg		90.0	50.2 - 149.5
Chromium	136	155.3	D	mg/Kg		114.2	70.0 - 130.1

Lab Sample ID: LCSSRM 160-406545/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	161	181.3	D	mg/Kg		112.6	70.2 - 129.8
Barium	260	284.3	D	mg/Kg		109.3	75.0 - 125.0
Beryllium	97.6	110.6	D	mg/Kg		113.3	75.0 - 125.0
Cadmium	211	230.6	D	mg/Kg		109.3	74.9 - 125.1
Cobalt	48.2	54.75	D	mg/Kg		113.6	74.9 - 124.9
Copper	166	191.2	D	mg/Kg		115.2	74.7 - 124.7
Lead	111	122.1	D	mg/Kg		110.0	71.0 - 128.8
Manganese	288	266.5	D	mg/Kg		92.5	57.3 - 101.0
Molybdenum	110	122.3	D	mg/Kg		111.2	70.5 - 129.1
Nickel	91.9	106.4	D	mg/Kg		115.8	70.0 - 129.5
Selenium	191	215.0	D	mg/Kg		112.6	68.6 - 131.9
Silver	43.3	47.87	D	mg/Kg		110.5	69.5 - 130.5
Strontium	107	118.3	D	mg/Kg		110.5	72.1 - 128.0

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406545/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	110.7	D	mg/Kg		110.8	56.8 - 143.1
Vanadium	56.7	61.45	D	mg/Kg		108.4	56.8 - 143.4
Zinc	199	223.3	D	mg/Kg		112.2	69.8 - 130.2

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6460	D	973	8874	D X	mg/Kg	☼	248	75 - 125
Chromium	9.9	D	97.3	94.91	D	mg/Kg	☼	87	75 - 125

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.1	D	97.3	98.19	D	mg/Kg	☼	98	75 - 125
Barium	85.2	D	97.3	188.1	D	mg/Kg	☼	106	75 - 125
Beryllium	0.35	D	9.73	10.70	D	mg/Kg	☼	106	75 - 125
Cadmium	0.096	D	97.3	96.05	D	mg/Kg	☼	99	75 - 125
Cobalt	8.9	D	97.3	106.2	D	mg/Kg	☼	100	75 - 125
Copper	15.3	D	97.3	110.0	D	mg/Kg	☼	97	75 - 125
Lead	11.5	D	97.3	107.1	D	mg/Kg	☼	98	75 - 125
Manganese	394	D	97.3	516.1	D X	mg/Kg	☼	125	75 - 125
Molybdenum	0.42	B D	48.7	49.25	D	mg/Kg	☼	100	75 - 125
Nickel	12.5	D	97.3	108.8	D	mg/Kg	☼	99	75 - 125
Selenium	1.8	D	48.7	45.48	D	mg/Kg	☼	90	75 - 125
Silver	0.074	U D	19.5	19.33	D	mg/Kg	☼	99	75 - 125
Strontium	21.0	D	97.3	120.8	D	mg/Kg	☼	103	75 - 125
Tin	0.49	D	97.3	96.21	D	mg/Kg	☼	98	75 - 125
Uranium	0.47	D	97.3	99.27	D	mg/Kg	☼	102	75 - 125
Vanadium	58.3	D	97.3	146.0	D	mg/Kg	☼	90	75 - 125
Zinc	48.5	D	97.3	142.0	D	mg/Kg	☼	96	75 - 125

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6460	D	912	9055	D X	mg/Kg	☼	284	75 - 125	2	30
Chromium	9.9	D	91.2	91.23	D	mg/Kg	☼	89	75 - 125	4	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.1	D	91.2	92.50	D	mg/Kg	☼	98	75 - 125	6	30
Barium	85.2	D	91.2	187.2	D	mg/Kg	☼	112	75 - 125	0	30
Beryllium	0.35	D	9.12	10.93	D	mg/Kg	☼	116	75 - 125	2	30
Cadmium	0.096	D	91.2	98.05	D	mg/Kg	☼	107	75 - 125	2	30
Cobalt	8.9	D	91.2	98.68	D	mg/Kg	☼	98	75 - 125	7	30
Copper	15.3	D	91.2	104.2	D	mg/Kg	☼	97	75 - 125	5	30
Lead	11.5	D	91.2	109.9	D	mg/Kg	☼	108	75 - 125	3	30
Manganese	394	D	91.2	487.1	D X	mg/Kg	☼	102	75 - 125	6	30
Molybdenum	0.42	B D	45.6	50.86	D	mg/Kg	☼	111	75 - 125	3	30
Nickel	12.5	D	91.2	101.7	D	mg/Kg	☼	98	75 - 125	7	30
Selenium	1.8	D	45.6	42.10	D	mg/Kg	☼	88	75 - 125	8	30
Silver	0.074	U D	18.2	19.64	D	mg/Kg	☼	108	75 - 125	2	30
Strontium	21.0	D	91.2	128.3	D	mg/Kg	☼	118	75 - 125	6	30
Tin	0.49	D	91.2	98.41	D	mg/Kg	☼	107	75 - 125	2	30
Uranium	0.47	D	91.2	102.5	D	mg/Kg	☼	112	75 - 125	3	30
Vanadium	58.3	D	91.2	134.4	D	mg/Kg	☼	83	75 - 125	8	30
Zinc	48.5	D	91.2	135.8	D	mg/Kg	☼	96	75 - 125	4	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/20/18 09:19	12/21/18 09:54	1

Lab Sample ID: LCSSRM 160-406817/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.64	D	mg/Kg		92.5	59.7 - 139.1

Lab Sample ID: 160-32196-1 MS — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.015	B	1.05	1.10		mg/Kg	☼	104	80 - 120

Lab Sample ID: 160-32196-1 MSD — **Client Sample ID: B3L2N3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.015	B	1.07	1.13		mg/Kg	☼	105	80 - 120	3	30

Date: 23 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8912-1, RL8932-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8912-1 and RL8932-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2H2	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D4	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F5	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F2	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D6	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F0	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F6	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D9	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H3	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D5	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H5	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H1	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F4	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D8	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H7	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H4	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F3	12/05/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H6	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2H0	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F9	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F8	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F1	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2F7	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3L2D7	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation

Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil/solid analysis.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable with the following exception.

For SDG RL8912-1, the Pu-242 tracer recovery for the LCS was above the upper acceptance limit. Since the sample was a QC sample, data should not be qualified as a result.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided.

- **Completeness**

SDGs RL8912-1 and RL8932-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8912-1, RL8932-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E

Project: RTL	Data Package: VSR19-014
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/23/19
	SDG: RL8912-1, RL8932-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241		

Samples/Matrix Soil

RL8912-1: B3L2H2, B3L2D4, B3L2F5, B3L2F2, B3L2D6, B3L2F0, B3L2F6, B3L2D9, B3L2H3, B3L2D5, B3L2H5, B3L2H1, B3L2F4, B3L2D8, B3L2H7, B3L2H4, B3L2F3

RL8932-1: B3L2H6, B3L2H0, B3L2F9, B3L2F8, B3L2F1, B3L2F7, B3L2D7

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☒ N/A
Chemical carrier added?	Yes No N/A
Chemical recovery acceptable?	Yes No N/A
Chemical carrier traceable? (Levels D, E)	Yes No N/A
Chemical carrier expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	Yes No N/A
Tracer recovery acceptable?	Yes No N/A
Tracer traceable? (Levels D, E)	Yes No N/A
Tracer expired? (Levels D, E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

RL8912-1 tracer Pu-242 LCS 108%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No (N/A)
Spike recoveries acceptable?	Yes No (N/A)
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

RPDs >30% - sample results were < the MDCs

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split sample(s) analyzed?	Yes (No) N/A
Field split RPD values acceptable?	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	(Yes) No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	(Yes) No N/A
Results supported in raw data?(Levels D, E)	Yes No (N/A)
Results acceptable? (Levels D, E)	Yes No (N/A)
MDC's meet required reporting limits?	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided.

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8912-1	B3L2H2	90.7
300-8912-1 DU	B3L2H2	85.0
300-8912-2	B3L2D4	78.1
300-8912-3	B3L2F5	98.3
300-8912-4	B3L2F2	90.4
300-8912-5	B3L2D6	64.8
300-8912-6	B3L2F0	83.0
300-8912-7	B3L2F6	92.8
300-8912-8	B3L2D9	96.8
300-8912-9	B3L2H3	101
300-8912-10	B3L2D5	96.7
300-8912-11	B3L2H5	80.3
300-8912-12	B3L2H1	96.3
300-8912-13	B3L2F4	88.8
300-8912-14	B3L2D8	80.4
300-8912-15	B3L2H7	60.0
300-8912-16	B3L2H4	89.9
300-8912-17	B3L2F3	44.9
LCS 300-16745/2-B	Lab Control Sample	96.8
MB 300-16745/1-A	Method Blank	99.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8912-1	B3L2H2	70.4
300-8912-2	B3L2D4	87.6
300-8912-3	B3L2F5	84.4
300-8912-4	B3L2F2	71.2
300-8912-5	B3L2D6	99.4
300-8912-6	B3L2F0	72.5
300-8912-7	B3L2F6	97.5
300-8912-8	B3L2D9	79.9
300-8912-9	B3L2H3	80.6
300-8912-10	B3L2D5	85.2
300-8912-11	B3L2H5	82.8
300-8912-12	B3L2H1	89.8
300-8912-13	B3L2F4	80.2
300-8912-14	B3L2D8	89.0
300-8912-15	B3L2H7	59.2
300-8912-16	B3L2H4	75.9
300-8912-17	B3L2F3	84.9
LCS 300-16747/2-A	Lab Control Sample	73.3
MB 300-16747/1-A	Method Blank	76.3

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8912-1
SDG: RL8912-1

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

			Percent Yield (Acceptance Limits)						
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8912-1	B3L2H2	90.7							
300-8912-1 DU	B3L2H2	85.0							
300-8912-2	B3L2D4	78.1							
300-8912-3	B3L2F5	98.3							
300-8912-4	B3L2F2	90.4							
300-8912-5	B3L2D6	64.8							
300-8912-6	B3L2F0	83.0							
300-8912-7	B3L2F6	92.8							
300-8912-8	B3L2D9	96.8							
300-8912-9	B3L2H3	101							
300-8912-10	B3L2D5	96.7							
300-8912-11	B3L2H5	80.3							
300-8912-12	B3L2H1	96.3							
300-8912-13	B3L2F4	88.8							
300-8912-14	B3L2D8	80.4							
300-8912-15	B3L2H7	60.0							
300-8912-16	B3L2H4	89.9							
300-8912-17	B3L2F3	44.9							
LCS 300-16750/2-A	Lab Control Sample	108							
MB 300-16750/1-A	Method Blank	99.4							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16680/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0235	U		0.0193	0.370	0.0577	pCi/g	12/15/18 13:58	12/24/18 08:35	1

Lab Sample ID: LCS 300-16680/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.549		0.195	0.370	0.113	pCi/g	97	80 - 120

Lab Sample ID: 300-8912-1 DU — **Client Sample ID: B3L2H2**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16949 — **Prep Batch: 16680**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0446	U	0.0285	U y	0.0711	0.370	0.0870	pCi/g	44	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16747/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17007 — **Prep Batch: 16747**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00507	U	0.0319	0.0319	1.00	0.0777	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-233/234	-0.00190	U	0.0318	0.0318	1.00	0.0660	pCi/g	12/17/18 17:06	12/27/18 12:41	1
U-235/236	-0.000634	U	0.0317	0.0317	1.00	0.0582	pCi/g	12/17/18 17:06	12/27/18 12:41	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*76.3*		*30 - 105*	*12/17/18 17:06*	*12/27/18 12:41*	*1*

Lab Sample ID: LCS 300-16747/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17007 — **Prep Batch: 16747**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.27	3.469		0.733	1.00	0.0740	pCi/g	106	80 - 120
U-233/234	3.12	3.582		0.752	1.00	0.0663	pCi/g	115	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*73.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16745/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00177	U	0.0301	0.0301	1.00	0.0966	pCi/g	12/17/18 16:59	12/24/18 08:26	1
Pu-239/240	0.000	U	0.0295	0.0295	1.00	0.0541	pCi/g	12/17/18 16:59	12/24/18 08:26	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.4*		*30 - 105*	*12/17/18 16:59*	*12/24/18 08:26*	*1*

Lab Sample ID: LCS 300-16745/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.63	5.237		1.04	1.00	0.0939	pCi/g	113	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*96.8*		*30 - 105*

Lab Sample ID: 300-8912-1 DU — **Client Sample ID: B3L2H2**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16940 — **Prep Batch: 16745**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0070	U		-0.00681	U	0.0265	1.00	0.0710	pCi/g			2	30
Pu-239/240	-0.00046	U		-0.00105	U y	0.0262	1.00	0.0517	pCi/g			77	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*85.0*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16750/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17047 — **Prep Batch: 16750**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.533	U	0.169	1.51	15.0	3.05	pCi/g	12/17/18 17:21	12/29/18 11:21	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.4*			*12/17/18 17:21*	*12/29/18 11:21*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Lab Sample ID: LCS 300-16750/2-A
Matrix: Solid
Analysis Batch: 17047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16750

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	211.9		14.1	15.0	3.01	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*108*		

Lab Sample ID: 300-8912-1 DU
Matrix: Solid
Analysis Batch: 17047

Client Sample ID: B3L2H2
Prep Type: Total/NA
Prep Batch: 16750

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.0345	U		0.481	U y	1.44	15.0	2.82	pCi/g			173	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*85.0*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8932-1	B3L2H6	94.4
300-8932-1 DU	B3L2H6	85.7
300-8932-2	B3L2H0	86.6
300-8932-3	B3L2F9	86.4
300-8932-4	B3L2F8	57.6
300-8932-5	B3L2F1	81.4
300-8932-6	B3L2F7	91.2
300-8932-7	B3L2D7	86.8
LCS 300-16807/2-A	Lab Control Sample	95.7
MB 300-16807/1-A	Method Blank	93.0

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8932-1	B3L2H6	90.2
300-8932-1 DU	B3L2H6	88.1
300-8932-2	B3L2H0	86.3
300-8932-3	B3L2F9	87.1
300-8932-4	B3L2F8	83.6
300-8932-5	B3L2F1	82.1
300-8932-6	B3L2F7	88.4
300-8932-7	B3L2D7	73.6
LCS 300-16821/2-A	Lab Control Sample	80.8
MB 300-16821/1-A	Method Blank	86.9

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8932-1	B3L2H6	94.4
300-8932-2	B3L2H0	86.6
300-8932-3	B3L2F9	86.4
300-8932-4	B3L2F8	57.6
300-8932-5	B3L2F1	81.4
300-8932-6	B3L2F7	91.2
300-8932-7	B3L2D7	86.8

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16796/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.00126	U		0.0511	0.370	0.0534	pCi/g	12/18/18 16:59	12/26/18 08:37	1

Lab Sample ID: LCS 300-16796/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.478		0.195	0.370	0.111	pCi/g	95	80 - 120

Lab Sample ID: 300-8932-1 DU — **Client Sample ID: B3L2H6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16968 — **Prep Batch: 16796**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0125	U	0.0302	U y	0.0832	0.370	0.0941	pCi/g	83	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16821/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17023 — **Prep Batch: 16821**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.000570	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-233/234	0.000	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1
U-235/236	0.000	U	0.0285	0.0285	1.00	0.0523	pCi/g	12/19/18 11:35	12/27/18 15:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.9*		*30 - 105*	*12/19/18 11:35*	*12/27/18 15:02*	*1*

Lab Sample ID: LCS 300-16821/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17023 — **Prep Batch: 16821**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	2.88	2.737		0.578	1.00	0.0488	pCi/g	95	80 - 120
U-233/234	2.75	2.990		0.619	1.00	0.0488	pCi/g	109	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*80.8*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8932-1 DU
Matrix: Solid
Analysis Batch: 17023

Client Sample ID: B3L2H6
Prep Type: Total/NA
Prep Batch: 16821

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0495	U		0.0519		0.0525	1.00	0.0476	pCi/g			5	30
U-233/234	0.0893			0.0779		0.0647	1.00	0.0476	pCi/g			14	30
U-235/236	0.000	U		0.0130	U y	0.0261	1.00	0.0476	pCi/g			200	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*88.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16807/1-A
Matrix: Solid
Analysis Batch: 17008

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16807

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00798	U	0.0310	0.0310	1.00	0.0832	pCi/g	12/19/18 09:05	12/27/18 12:05	1
Pu-239/240	-0.00123	U	0.0307	0.0307	1.00	0.0606	pCi/g	12/19/18 09:05	12/27/18 12:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*93.0*		*30 - 105*	*12/19/18 09:05*	*12/27/18 12:05*	*1*

Lab Sample ID: LCS 300-16807/2-A
Matrix: Solid
Analysis Batch: 17008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16807

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.43	4.149		0.807	1.00	0.0584	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*95.7*		*30 - 105*

Lab Sample ID: 300-8932-1 DU
Matrix: Solid
Analysis Batch: 17008

Client Sample ID: B3L2H6
Prep Type: Total/NA
Prep Batch: 16807

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0045	U		-0.0102	U y	0.0305	1.00	0.0865	pCi/g			78	30
Pu-239/240	-0.00056	U		-0.00240	U y	0.0301	1.00	0.0651	pCi/g			124	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*85.7*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-048

TestAmerica Job ID: 300-8932-1
SDG: RL8932-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16817/1-A
Matrix: Solid
Analysis Batch: 17060

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16817

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.711	U	0.178	1.74	15.0	3.09	pCi/g	12/19/18 11:08	12/28/18 19:27	1

Lab Sample ID: LCS 300-16817/2-A
Matrix: Solid
Analysis Batch: 17060

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16817

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			214	212.6		14.4	15.0	2.84	pCi/g	99	80 - 120		

Lab Sample ID: 300-8932-1 DU
Matrix: Solid
Analysis Batch: 17060

Client Sample ID: B3L2H6
Prep Type: Total/NA
Prep Batch: 16817

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.49	U		1.343	U	1.58	15.0	2.86	pCi/g			10	30

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	01/28/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-015		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval

01/28/2019 — Date

Scot Fitzgerald — Organization Manager (optional) (print and sign)

10. Agreement With Indicated Comment Disposition(s)

Date

Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

1/29/18 — Date

Reviewer/Point of Contact (print and sign)

Scot Fitzgerald — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	On Page 6 under the surrogate discussion for GEL466742 the narrative states detects should be flagged "J". The summary states "J+".		Resolve discrepancy	Y		closed
2	On page 6 under the precision discussion, Acetone is called out as failing RPD criteria. The RPD criteria is 35% and the MS/MSD RPD for acetone is 33%, which meets criteria.		Correct narrative and data qualification summary.	Y		closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
1/28/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-015 VSR19-015 Rev 1		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/28/2019 — Date Jadie Kaas — Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/29/19 — Date Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT accepted**)	16. Status
1	No other issues noted than the Two comments reported on Scot Fitzgerald's RCR dated 1/28/19					Closed

PO Box 21987
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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-015
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-25-2019**

Technical Review By: Ellen McEntee **Date: 01-28-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 01-29-2019**

Mary Donivan
Quality Assurance Manager

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Date: 29 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Groups (SDGs) GEL466742, SL32193-1

INTRODUCTION

This memorandum presents the results of data validation for SDG GEL466742 prepared by GEL Laboratories LLC and SDG SL32193-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2Y2A	12/07/18	Soil	C	8260C
B3L2Y5A	12/07/18	Soil	C	8260C
B3L307A	12/07/18	Soil	C	8260C
B3L319A	12/07/18	Soil	C	8260C
B3L328A	12/07/18	Soil	C	8260C
B3L340A	12/07/18	Soil	C	8260C
B3L345A	12/07/18	Soil	C	8260C
B3L325A	12/07/18	Soil	C	8260C
B3L301A	12/07/18	Soil	C	8260C
B3L322A	12/07/18	Soil	C	8260C
B3L310A	12/07/18	Soil	C	8260C
B3L2Y8	12/06/18	Soil	C	8260C
B3L331	12/06/18	Soil	C	8260C
B3L304	12/06/18	Soil	C	8260C
B3L334	12/06/18	Soil	C	8260C
B3L337	12/06/18	Soil	C	8260C
B3L313	12/06/18	Soil	C	8260C
B3L316	12/06/18	Soil	C	8260C
B3L344	12/06/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved with the following exception.

For SDG SL32193-1, all samples were prepared beyond but within 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL466742, the 1,2-dichloroethane-d4, toluene-d8 and bromofluorobenzene surrogate recoveries for samples B3L2Y2A, B3L319A, B3L328A, B3L345A and B3L301A and the

toluene-d8 and bromofluorobenzene for sample B3L2Y5A were above the upper acceptance limit. All detect sample results should be qualified as estimates and flagged "J+." All non-detect sample results should not be qualified as a result. See the table in Appendix 2 for a listing of all affected sample results.

For SDG SL32193-1, the bromofluorobenzene surrogate recovery for sample B3L313 was above the upper acceptance limit. All sample results were non-detects and should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception.

For SDG SL32193, the MS and MSD recoveries for 1,1,2,2-tetrachloroethane, acetone and bromoform were above the upper acceptance limit. All associated sample results were non-detects and should be not be qualified as a result.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

LCS/LCSD Samples

All reported LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

All field split results were acceptable.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

The CRDL for methylene chloride was met. No other CRDLS for VOCs were provided in the SAP.

- **Completeness**

SDGs GEL466742 and SL32193-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 58%.

MAJOR DEFICIENCIES

Major deficiency leading to qualification of sample results as unusable was due to samples extracted beyond but within 2X the holding time. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to high surrogate recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDG: GEL466742, SL32193-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
All VOC analytes	UR	B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316, B3L344	Extracted beyond but within 2X the holding time.
1,1-dichloroethylene	J+	B3L2Y2A, B3L2Y5A, B3L319A, B3L328A, B3L301A	High surrogate recoveries
methylene chloride, toluene	J+	B3L345A	High surrogate recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: GEL, TestAmerica		DATE: 01/29/19	
			SDG: GEL466742, SL32193-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
GEL466742: B3L2Y2A, B3L2Y5A, B3L307A, B3L319A, B3L328A, B3L340A, B3L345A, B3L325A, B3L301A, B3L322A, B3L310A					
SL32193-1: B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316, B3L344					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

GEL466742: B3L2Y2A DCED4 177%, TOL 194%, BFB 204%: B3L2Y5A TOL 132%, BFB 162%, B3L319A DCED4 136%, TOL 165% BFB 198%; B3L328A DCED4 289%, TOL 317% BFB 445%, B3L345A DCED4 245%, TOL 252%, BFB 232%, B3L301A DCED4 136%, TOL 155%, BFB 182%

SL32193-1: B3L313 BFB 136%

MS/MSD

GEL466742 MS/MSD was not analyzed

SL32193-1 1,1,2,2-tetrachloroethane 153%/148%, acetone 278%/199%, bromoform 161%/153%,

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SL32193-1 B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316, and B3L344 were prepped 21 days after sample collection.

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL for methylene chloride was met.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No (N/A)
GPC check performed?	Yes No (N/A)
GPC check recoveries acceptable?	Yes No (N/A)
GPC calibration performed?	Yes No (N/A)
GPC calibration check performed?	Yes No (N/A)
GPC calibration check retention times acceptable?	Yes No (N/A)
Check/calibration materials traceable?	Yes No (N/A)
Check/calibration materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 27, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
QC1204181191 LCS											
1,1,1-Trichloroethane	50.0			41.1	ug/kg		82	(70%-130%)	JP1	12/14/18	11:16
1,1,2,2-Tetrachloroethane	50.0			44.5	ug/kg		89	(70%-130%)			
1,1,2-Trichloroethane	50.0			47.1	ug/kg		94	(70%-130%)			
1,1-Dichloroethane	50.0			45.7	ug/kg		91	(70%-130%)			
1,1-Dichloroethylene	50.0			44.6	ug/kg		89	(70%-130%)			
1,2-Dichloroethane	50.0			40.6	ug/kg		81	(70%-130%)			
1,2-Dichloroethylene (total)	100			89.8	ug/kg		90	(70%-130%)			
1,2-Dichloropropane	50.0			46.8	ug/kg		94	(70%-130%)			
2-Butanone	250			246	ug/kg		98	(70%-130%)			
2-Hexanone	250			297	ug/kg		119	(70%-130%)			
4-Methyl-2-pentanone	250			282	ug/kg		113	(70%-130%)			
Acetone	250			265	ug/kg		106	(70%-130%)			
Benzene	50.0			42.0	ug/kg		84	(70%-130%)			

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
Bromodichloromethane	50.0			45.4	ug/kg		91	(70%-130%)	JP1	12/14/18	11:16
Bromoform	50.0			51.0	ug/kg		102	(70%-130%)			
Bromomethane	50.0			42.0	ug/kg		84	(70%-130%)			
Carbon disulfide	250			202	ug/kg		81	(70%-130%)			
Carbon tetrachloride	50.0			40.3	ug/kg		81	(70%-130%)			
Chlorobenzene	50.0			48.8	ug/kg		98	(70%-130%)			
Chloroethane	50.0			42.7	ug/kg		85	(70%-130%)			
Chloroform	50.0			42.9	ug/kg		86	(70%-130%)			
Chloromethane	50.0			52.6	ug/kg		105	(70%-130%)			
Dibromochloromethane	50.0			51.7	ug/kg		103	(70%-130%)			
Ethylbenzene	50.0			46.5	ug/kg		93	(70%-130%)			
Methylene chloride	50.0			44.8	ug/kg		90	(70%-130%)			
Styrene	50.0			47.4	ug/kg		95	(70%-130%)			
Tetrachloroethylene	50.0			49.3	ug/kg		99	(70%-130%)			
Toluene	50.0			46.1	ug/kg		92	(70%-130%)			

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1832159										
Trichloroethylene	50.0			42.1	ug/kg		84	(70%-130%)	JP1	12/14/18 11:16
Vinyl chloride	50.0			47.3	ug/kg		95	(70%-130%)		
Xylenes (total)	150			145	ug/kg		97	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			45.7	ug/kg		91	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			48.2	ug/kg		96	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			46.4	ug/L		93	(81%-124%)		
**Bromofluorobenzene	50.0			44.4	ug/L		89	(70%-130%)		
**Toluene-d8	50.0			49.9	ug/L		100	(81%-120%)		
QC1204181192 LCSD										
1,1,1-Trichloroethane	50.0			44.1	ug/kg	7	88	(0%-20%)		12/14/18 11:47
1,1,2,2-Tetrachloroethane	50.0			51.2	ug/kg	14	102	(0%-20%)		
1,1,2-Trichloroethane	50.0			51.4	ug/kg	9	103	(0%-20%)		
1,1-Dichloroethane	50.0			49.3	ug/kg	8	99	(0%-20%)		
1,1-Dichloroethylene	50.0			48.9	ug/kg	9	98	(0%-20%)		
1,2-Dichloroethane	50.0			45.9	ug/kg	12	92	(0%-20%)		
1,2-Dichloroethylene (total)	100			97.4	ug/kg	8	97	(0%-20%)		

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
1,2-Dichloropropane	50.0			52.0	ug/kg	10	104	(0%-20%)	JP1	12/14/18	11:47
2-Butanone	250			273	ug/kg	11	109	(0%-20%)			
2-Hexanone	250			326	ug/kg	9	130	(0%-20%)			
4-Methyl-2-pentanone	250			313	ug/kg	10	125	(0%-20%)			
Acetone	250			287	ug/kg	8	115	(0%-20%)			
Benzene	50.0			47.0	ug/kg	11	94	(0%-20%)			
Bromodichloromethane	50.0			48.7	ug/kg	7	97	(0%-20%)			
Bromoform	50.0			56.7	ug/kg	11	113	(0%-20%)			
Bromomethane	50.0			45.8	ug/kg	9	92	(0%-20%)			
Carbon disulfide	250			220	ug/kg	9	88	(0%-20%)			
Carbon tetrachloride	50.0			42.9	ug/kg	6	86	(0%-20%)			
Chlorobenzene	50.0			52.6	ug/kg	7	105	(0%-20%)			
Chloroethane	50.0			47.3	ug/kg	10	95	(0%-20%)			
Chloroform	50.0			46.7	ug/kg	8	93	(0%-20%)			
Chloromethane	50.0			55.1	ug/kg	5	110	(0%-20%)			

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1832159										
Dibromochloromethane	50.0			55.6	ug/kg	7	111	(0%-20%)	JP1	12/14/18 11:47
Ethylbenzene	50.0			48.9	ug/kg	5	98	(0%-20%)		
Methylene chloride	50.0			50.3	ug/kg	12	101	(0%-20%)		
Styrene	50.0			52.4	ug/kg	10	105	(0%-20%)		
Tetrachloroethylene	50.0			52.0	ug/kg	5	104	(0%-20%)		
Toluene	50.0			51.7	ug/kg	12	103	(0%-20%)		
Trichloroethylene	50.0			46.2	ug/kg	9	92	(0%-20%)		
Vinyl chloride	50.0			50.6	ug/kg	7	101	(0%-20%)		
Xylenes (total)	150			154	ug/kg	6	102	(0%-20%)		
cis-1,3-Dichloropropylene	50.0			51.0	ug/kg	11	102	(0%-20%)		
trans-1,3-Dichloropropylene	50.0			51.7	ug/kg	7	103	(0%-20%)		
**1,2-Dichloroethane-d4	50.0			46.1	ug/L		92	(81%-124%)		
**Bromofluorobenzene	50.0			45.5	ug/L		91	(70%-130%)		
**Toluene-d8	50.0			51.0	ug/L		102	(81%-120%)		
QC1204181188 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					12/14/18 14:21

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg				JP1	12/14/18	14:21
1,1,2-Trichloroethane			U	0.300	ug/kg						
1,1-Dichloroethane			U	0.300	ug/kg						
1,1-Dichloroethylene			U	0.300	ug/kg						
1,2-Dichloroethane			U	0.300	ug/kg						
1,2-Dichloroethylene (total)			U	0.300	ug/kg						
1,2-Dichloropropane			U	0.300	ug/kg						
2-Butanone			U	3.00	ug/kg						
2-Hexanone			U	3.00	ug/kg						
4-Methyl-2-pentanone			U	3.00	ug/kg						
Acetone			U	3.00	ug/kg						
Benzene			U	0.300	ug/kg						
Bromodichloromethane			U	0.300	ug/kg						
Bromoform			U	0.300	ug/kg						
Bromomethane			U	0.300	ug/kg						

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
Carbon disulfide			U	1.60	ug/kg				JP1	12/14/18	14:21
Carbon tetrachloride			U	0.300	ug/kg						
Chlorobenzene			U	0.300	ug/kg						
Chloroethane			U	0.300	ug/kg						
Chloroform			U	0.300	ug/kg						
Chloromethane			U	0.300	ug/kg						
Dibromochloromethane			U	0.300	ug/kg						
Ethylbenzene			U	0.300	ug/kg						
Methylene chloride			U	1.60	ug/kg						
Styrene			U	0.300	ug/kg						
Tetrachloroethylene			U	0.300	ug/kg						
Toluene			U	0.300	ug/kg						
Trichloroethylene			U	0.300	ug/kg						
Trichlorotrifluoroethane			U	1.60	ug/kg						
Vinyl chloride			U	0.300	ug/kg						

QC Summary

Workorder: **466742**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1832159											
Xylenes (total)			U	0.300	ug/kg				JP1	12/14/18	14:21
cis-1,3-Dichloropropylene			U	0.300	ug/kg						
trans-1,3-Dichloropropylene			U	0.300	ug/kg						
**1,2-Dichloroethane-d4	50.0			45.0	ug/L		90	(81%-124%)			
**Bromofluorobenzene	50.0			44.2	ug/L		88	(70%-130%)			
**Toluene-d8	50.0			53.3	ug/L		107	(81%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Volatile

Surrogate Recovery Report

SDG Number: GEL466742

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1204181191	LCS for batch 1832158	93	100	89
1204181192	LCSD for batch 1832158	92	102	91
1204181188	MB for batch 1832158	90	107	88
466742001	B3L2Y2A	177 *	194 *	204 *
466742002	B3L2Y5A	111	132 *	162 *
466742003	B3L307A	104	110	110
466742004	B3L319A	136 *	165 *	198 *
466742005	B3L328A	289 *	317 *	445 *
466742006	B3L340A	110	111	116
466742007	B3L345A	245 *	252 *	232 *
466742008	B3L325A	116	110	108
466742009	B3L301A	136 *	155 *	182 *
466742010	B3L322A	105	107	100
466742011	B3L310A	118	115	107

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(81%-124%)
TOL	= Toluene-d8	(81%-120%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-407594/8
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/27/18 09:09	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/27/18 09:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/27/18 09:09	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/27/18 09:09	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/27/18 09:09	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/27/18 09:09	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/27/18 09:09	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/27/18 09:09	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/27/18 09:09	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/27/18 09:09	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/27/18 09:09	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/27/18 09:09	1
Acetone	6.5	U	20	6.5	ug/Kg			12/27/18 09:09	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/27/18 09:09	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/27/18 09:09	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/27/18 09:09	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/27/18 09:09	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/27/18 09:09	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/27/18 09:09	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/27/18 09:09	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/27/18 09:09	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/27/18 09:09	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/27/18 09:09	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/27/18 09:09	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/27/18 09:09	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/27/18 09:09	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/27/18 09:09	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/27/18 09:09	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/27/18 09:09	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/27/18 09:09	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/27/18 09:09	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/27/18 09:09	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/27/18 09:09	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/27/18 09:09	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/27/18 09:09*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*67 - 132*		*12/27/18 09:09*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*		*12/27/18 09:09*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 143*		*12/27/18 09:09*	*1*
Toluene-d8 (Surr)	*104*		*74 - 135*		*12/27/18 09:09*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407594/5
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	50.9		ug/Kg		102	71 - 127
1,1,2,2-Tetrachloroethane	50.0	50.9		ug/Kg		102	52 - 140
1,1,2-Trichloroethane	50.0	51.5		ug/Kg		103	79 - 122
1,1-Dichloroethane	50.0	49.0		ug/Kg		98	80 - 120
1,1-Dichloroethene	50.0	50.5		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	50.6		ug/Kg		101	68 - 128
1,2-Dichloroethene, Total	100	101		ug/Kg		101	79 - 121
1,2-Dichloropropane	50.0	50.3		ug/Kg		101	80 - 126
2-Butanone (MEK)	50.0	50.9		ug/Kg		102	41 - 140
2-Hexanone	50.0	48.9		ug/Kg		98	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	47.7		ug/Kg		95	67 - 130
Acetone	50.0	49.5		ug/Kg		99	39 - 140
Benzene	50.0	49.3		ug/Kg		99	80 - 120
Bromodichloromethane	50.0	51.3		ug/Kg		103	78 - 124
Bromoform	50.0	51.6		ug/Kg		103	67 - 135
Bromomethane	50.0	46.0		ug/Kg		92	61 - 132
Carbon disulfide	50.0	48.9		ug/Kg		98	74 - 124
Carbon tetrachloride	50.0	50.5		ug/Kg		101	68 - 130
Chlorobenzene	50.0	50.1		ug/Kg		100	80 - 120
Chloroethane	50.0	43.2		ug/Kg		86	73 - 129
Chloroform	50.0	49.0		ug/Kg		98	78 - 120
Chloromethane	50.0	41.2		ug/Kg		82	69 - 123
cis-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	78 - 127
Dibromochloromethane	50.0	53.4		ug/Kg		107	77 - 126
Ethylbenzene	50.0	50.9		ug/Kg		102	79 - 126
Methylene Chloride	50.0	49.8		ug/Kg		100	76 - 120
Styrene	50.0	53.3		ug/Kg		107	80 - 129
Tetrachloroethene	50.0	50.9		ug/Kg		102	76 - 126
Toluene	50.0	52.1		ug/Kg		104	76 - 136
trans-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	77 - 136
Trichloroethene	50.0	48.3		ug/Kg		97	66 - 130
Vinyl chloride	50.0	46.8		ug/Kg		94	56 - 134
Xylenes, Total	100	109		ug/Kg		109	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*67 - 132*
4-Bromofluorobenzene (Surr)	*98*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-407594/6
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.8		ug/Kg		104	71 - 127	2	20
1,1,2,2-Tetrachloroethane	50.0	50.5		ug/Kg		101	52 - 140	1	20
1,1,2-Trichloroethane	50.0	50.4		ug/Kg		101	79 - 122	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407594/6
Matrix: Solid
Analysis Batch: 407594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	49.0		ug/Kg		98	80 - 120	0	20
1,1-Dichloroethene	50.0	50.2		ug/Kg		100	71 - 126	0	20
1,2-Dichloroethane	50.0	49.2		ug/Kg		98	68 - 128	3	20
1,2-Dichloroethene, Total	100	101		ug/Kg		101	79 - 121	0	20
1,2-Dichloropropane	50.0	49.9		ug/Kg		100	80 - 126	1	20
2-Butanone (MEK)	50.0	48.5		ug/Kg		97	41 - 140	5	20
2-Hexanone	50.0	47.8		ug/Kg		96	63 - 136	2	20
4-Methyl-2-pentanone (MIBK)	50.0	46.7		ug/Kg		93	67 - 130	2	20
Acetone	50.0	45.4		ug/Kg		91	39 - 140	9	20
Benzene	50.0	49.6		ug/Kg		99	80 - 120	1	20
Bromodichloromethane	50.0	50.9		ug/Kg		102	78 - 124	1	20
Bromoform	50.0	52.3		ug/Kg		105	67 - 135	1	20
Bromomethane	50.0	45.7		ug/Kg		91	61 - 132	1	20
Carbon disulfide	50.0	49.3		ug/Kg		99	74 - 124	1	20
Carbon tetrachloride	50.0	50.8		ug/Kg		102	68 - 130	0	20
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120	3	20
Chloroethane	50.0	42.5		ug/Kg		85	73 - 129	2	20
Chloroform	50.0	49.5		ug/Kg		99	78 - 120	1	20
Chloromethane	50.0	40.7		ug/Kg		81	69 - 123	1	20
cis-1,3-Dichloropropene	50.0	53.3		ug/Kg		107	78 - 127	3	20
Dibromochloromethane	50.0	53.4		ug/Kg		107	77 - 126	0	20
Ethylbenzene	50.0	51.8		ug/Kg		104	79 - 126	2	20
Methylene Chloride	50.0	49.4		ug/Kg		99	76 - 120	1	20
Styrene	50.0	53.9		ug/Kg		108	80 - 129	1	20
Tetrachloroethene	50.0	51.0		ug/Kg		102	76 - 126	0	20
Toluene	50.0	53.5		ug/Kg		107	76 - 136	3	20
trans-1,3-Dichloropropene	50.0	55.0		ug/Kg		110	77 - 136	0	20
Trichloroethene	50.0	48.5		ug/Kg		97	66 - 130	0	20
Vinyl chloride	50.0	47.3		ug/Kg		95	56 - 134	1	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32193-8 MS
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.56	U Z	58.3	62.0		ug/Kg	☼	106	80 - 120
1,1,2,2-Tetrachloroethane	2.5	U Z T	58.3	89.1	T	ug/Kg	☼	153	78 - 120
1,1,2-Trichloroethane	1.5	U Z	58.3	69.8		ug/Kg	☼	120	80 - 120
1,1-Dichloroethane	0.50	U Z	58.3	62.3		ug/Kg	☼	107	80 - 120
1,1-Dichloroethene	2.1	U Z	58.3	61.7		ug/Kg	☼	106	78 - 121
1,2-Dichloroethane	1.1	U Z	58.3	63.2		ug/Kg	☼	109	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32193-8 MS
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.7	U Z	117	125		ug/Kg	☼	107	80 - 120
1,2-Dichloropropane	0.78	U Z	58.3	61.2		ug/Kg	☼	105	80 - 120
2-Butanone (MEK)	2.5	U Z	58.3	53.4		ug/Kg	☼	92	69 - 124
2-Hexanone	4.4	U Z	58.3	53.8		ug/Kg	☼	92	62 - 118
4-Methyl-2-pentanone (MIBK)	3.3	U Z	58.3	64.4		ug/Kg	☼	111	73 - 125
Acetone	8.4	U Z T	58.3	162	T	ug/Kg	☼	278	54 - 139
Benzene	0.33	U Z	58.3	61.7		ug/Kg	☼	106	80 - 120
Bromodichloromethane	0.64	U Z	58.3	60.9		ug/Kg	☼	104	80 - 120
Bromoform	2.5	U Z T	58.3	93.9	T	ug/Kg	☼	161	80 - 125
Bromomethane	3.1	U Z	58.3	54.9		ug/Kg	☼	94	70 - 126
Carbon disulfide	0.89	U Z	58.3	58.2		ug/Kg	☼	100	79 - 121
Carbon tetrachloride	0.66	U Z	58.3	57.3		ug/Kg	☼	98	80 - 120
Chlorobenzene	1.0	U Z	58.3	58.6		ug/Kg	☼	101	80 - 120
Chloroethane	2.5	U Z	58.3	53.0		ug/Kg	☼	91	64 - 133
Chloroform	0.49	U Z	58.3	61.8		ug/Kg	☼	106	80 - 120
Chloromethane	0.84	U Z	58.3	50.7		ug/Kg	☼	87	75 - 120
cis-1,3-Dichloropropene	2.7	U Z	58.3	61.9		ug/Kg	☼	106	80 - 120
Dibromochloromethane	1.6	U Z T	58.3	68.4		ug/Kg	☼	117	80 - 120
Ethylbenzene	0.89	U Z	58.3	55.8		ug/Kg	☼	96	80 - 120
Methylene Chloride	2.0	U Z	58.3	63.7		ug/Kg	☼	109	77 - 123
Styrene	2.5	U Z	58.3	53.5		ug/Kg	☼	92	80 - 120
Tetrachloroethene	0.73	U Z	58.3	51.6		ug/Kg	☼	89	80 - 120
Toluene	3.2	U Z	58.3	68.8		ug/Kg	☼	118	80 - 124
trans-1,3-Dichloropropene	2.2	U Z T	58.3	72.4	T	ug/Kg	☼	124	80 - 122
Trichloroethene	0.50	U Z	58.3	56.3		ug/Kg	☼	97	79 - 120
Vinyl chloride	0.56	U Z	58.3	56.6		ug/Kg	☼	97	71 - 120
Xylenes, Total	1.1	U Z	117	116		ug/Kg	☼	100	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*105*		*67 - 132*
4-Bromofluorobenzene (Surr)	*107*		*59 - 150*
Dibromofluoromethane (Surr)	*104*		*53 - 143*
Toluene-d8 (Surr)	*111*		*74 - 135*

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.56	U Z	58.4	64.0		ug/Kg	☼	110	80 - 120	3	20
1,1,2,2-Tetrachloroethane	2.5	U Z T	58.4	86.6	T	ug/Kg	☼	148	78 - 120	3	20
1,1,2-Trichloroethane	1.5	U Z	58.4	68.5		ug/Kg	☼	117	80 - 120	2	20
1,1-Dichloroethane	0.50	U Z	58.4	61.8		ug/Kg	☼	106	80 - 120	1	20
1,1-Dichloroethene	2.1	U Z	58.4	60.6		ug/Kg	☼	104	78 - 121	2	20
1,2-Dichloroethane	1.1	U Z	58.4	63.5		ug/Kg	☼	109	78 - 117	0	20
1,2-Dichloroethene, Total	1.7	U Z	117	125		ug/Kg	☼	107	80 - 120	0	20
1,2-Dichloropropane	0.78	U Z	58.4	62.2		ug/Kg	☼	107	80 - 120	2	20
2-Butanone (MEK)	2.5	U Z	58.4	59.5		ug/Kg	☼	102	69 - 124	11	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.4	U Z	58.4	61.3		ug/Kg	☼	105	62 - 118	13	20
4-Methyl-2-pentanone (MIBK)	3.3	U Z	58.4	64.5		ug/Kg	☼	111	73 - 125	0	20
Acetone	8.4	U Z T	58.4	116	T y	ug/Kg	☼	199	54 - 139	33	20
Benzene	0.33	U Z	58.4	62.2		ug/Kg	☼	107	80 - 120	1	20
Bromodichloromethane	0.64	U Z	58.4	63.0		ug/Kg	☼	108	80 - 120	3	20
Bromoform	2.5	U Z T	58.4	89.4	T	ug/Kg	☼	153	80 - 125	5	20
Bromomethane	3.1	U Z	58.4	55.0		ug/Kg	☼	94	70 - 126	0	20
Carbon disulfide	0.89	U Z	58.4	59.4		ug/Kg	☼	102	79 - 121	2	20
Carbon tetrachloride	0.66	U Z	58.4	61.0		ug/Kg	☼	104	80 - 120	6	20
Chlorobenzene	1.0	U Z	58.4	63.4		ug/Kg	☼	109	80 - 120	8	20
Chloroethane	2.5	U Z	58.4	54.2		ug/Kg	☼	93	64 - 133	2	20
Chloroform	0.49	U Z	58.4	62.2		ug/Kg	☼	106	80 - 120	1	20
Chloromethane	0.84	U Z	58.4	50.1		ug/Kg	☼	86	75 - 120	1	20
cis-1,3-Dichloropropene	2.7	U Z	58.4	64.8		ug/Kg	☼	111	80 - 120	5	20
Dibromochloromethane	1.6	U Z T	58.4	71.6	T	ug/Kg	☼	123	80 - 120	5	20
Ethylbenzene	0.89	U Z	58.4	63.8		ug/Kg	☼	109	80 - 120	13	20
Methylene Chloride	2.0	U Z	58.4	63.1		ug/Kg	☼	108	77 - 123	1	20
Styrene	2.5	U Z	58.4	63.3		ug/Kg	☼	108	80 - 120	17	20
Tetrachloroethene	0.73	U Z	58.4	60.8		ug/Kg	☼	104	80 - 120	16	20
Toluene	3.2	U Z	58.4	68.9		ug/Kg	☼	118	80 - 124	0	20
trans-1,3-Dichloropropene	2.2	U Z T	58.4	72.3	T	ug/Kg	☼	124	80 - 122	0	20
Trichloroethene	0.50	U Z	58.4	59.5		ug/Kg	☼	102	79 - 120	6	20
Vinyl chloride	0.56	U Z	58.4	55.1		ug/Kg	☼	94	71 - 120	3	20
Xylenes, Total	1.1	U Z	117	136		ug/Kg	☼	117	80 - 120	16	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*110*		*67 - 132*
4-Bromofluorobenzene (Surr)	*126*		*59 - 150*
Dibromofluoromethane (Surr)	*110*		*53 - 143*
Toluene-d8 (Surr)	*114*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32193-8	B3L2Y8	107	120	106	110
160-32193-8 MS	B3L2Y8	105	107	104	111
160-32193-8 MSD	B3L2Y8	110	126	110	114
160-32193-9	B3L331	108	119	107	109
160-32193-10	B3L304	111	128	108	116
160-32193-11	B3L334	111	103	106	103
160-32193-12	B3L337	117	105	105	105
160-32193-13	B3L313	122	136	114	121
160-32193-14	B3L316	115	102	105	103
160-32193-15	B3L344	116	101	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-407594/5	Lab Control Sample	102	98	102	102
LCSD 160-407594/6	Lab Control Sample Dup	98	100	101	104
MB 160-407594/8	Method Blank	105	99	103	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32193-8	B3L2Y8	72	76	78	64	73	78
160-32193-8 MS	B3L2Y8	85	80	78	68	72	85
160-32193-8 MSD	B3L2Y8	83	81	84	72	76	88
160-32193-9	B3L331	87	85	85	70	80	84
160-32193-10	B3L304	84	81	79	64	75	85
160-32193-11	B3L334	81	82	79	64	78	86
160-32193-12	B3L337	85	84	78	65	74	85
160-32193-13 - DL	B3L313	75	75	77	57	67	81
160-32193-14	B3L316	82	81	81	67	76	86

Surrogate Legend

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL32193-1, SL32227-1, GEL466527, GEL466597

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32193-1 and SL32227-1 prepared by TestAmerica Laboratories Inc. and SDGs GEL466527 and GEL466597 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2Y8	12/06/18	Soil	C	8270D
B3L331	12/06/18	Soil	C	8270D
B3L304	12/06/18	Soil	C	8270D
B3L334	12/06/18	Soil	C	8270D
B3L337	12/06/18	Soil	C	8270D
B3L313	12/06/18	Soil	C	8270D
B3L316	12/06/18	Soil	C	8270D
B3L310	12/07/18	Soil	C	8270D
B3L322	12/07/18	Soil	C	8270D
B3L301	12/07/18	Soil	C	8270D
B3L325	12/07/18	Soil	C	8270D
B3L319	12/07/18	Soil	C	8270D
B3L307	12/07/18	Soil	C	8270D
B3L2Y2	12/07/18	Soil	C	8270D
B3L2Y5	12/07/18	Soil	C	8270D
B3L328	12/07/18	Soil	C	8270D
B3L340	12/07/18	Soil	C	8270D
B3MN21	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN23	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN26	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN27	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN32	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN33	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN34	12/06/18	Soil	C	WTPH-D, WTPH-G
B3MN20	12/07/18	Soil	C	WTPH-D, WTPH-G
B3MN25	12/07/08	Soil	C	WTPH-D, WTPH-G
B3MN19	12/07/18	Soil	C	WTPH-D, WTPH-G
B3MN30	12/07/08	Soil	C	WTPH-D, WTPH-G
B3MN31	12/07/18	Soil	C	WTPH-D, WTPH-G
B3MN28	12/07/08	Soil	C	WTPH-D, WTPH-G

B3MN29	12/07/18	Soil	C	WTPH-D, WTPH-G
B3MN35	12/07/08	Soil	C	WTPH-D, WTPH-G
B3MN22	12/07/18	Soil	C	WTPH-D, WTPH-G
B3MN24	12/07/08	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for methods 8270D and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. WTPH-G requires analysis within 14 days from sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exceptions.

For SDG GEL466527, all samples were analyzed beyond but within 2X the holding time for WTPH-G. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466597, all samples were analyzed beyond but within 2X the holding time for WTPH-G. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL32193-1, the nitrobenzene-d5 surrogate recoveries for samples B3L2Y8, B3L2Y8MS, B3L304, B3L334, B3L337, B3L316 and the MB and the nitrobenzene-d5 and phenol-d5 for sample B3L313 were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries were within the acceptance limits and data should not be qualified as a result.

SDG SL32227-1
The nitrobenzene-d5 surrogate recoveries for samples B3L301, B3L319, B3L328 and B3L340 were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries were within the acceptance limit and data should not be qualified as a result.

The 2,4,6-tribromophenol and nitrobenzene surrogate recoveries for samples B3L325 and B3L2Y2 and the MB and the nitrobenzene and phenol-d5 surrogate recoveries for sample B3L310MS were below the lower acceptance limit but ≥20%. All other surrogate recoveries within the acceptance limit and data should not be qualified as a result.

The 2-fluorobiphenyl, nitrobenzene and phenol-d5 surrogate recoveries for sample B3L310MSD were below the lower acceptance limit but ≥20%. Since the sample was a QC sample, data should not be qualified as a result.

The 2,4,6-tribromophenol, 2-fluorobiphenyl, nitrobenzene-d5 and phenol-d5 surrogate recoveries for samples B3L310, the 2,4,6-tribromophenol, nitrobenzene-d5, and phenol-d5 surrogate recoveries for B3L307 and the 2,4,6-tribromophenol, 2-fluorobiphenyl, 2-fluorophenyl, and nitrobenzene-d5 surrogate recoveries for sample B3L2Y5 were below the lower acceptance limit

but ≥20%. The sample results were analyzed at dilutions and based on professional judgment data should not be qualified as a result.

For SDG GEL466527, the bromofluorobenzene surrogate recoveries for samples B3MN23 and B3MN26 were below the lower acceptance limit but ≥10%. The WTPH-G results for these samples were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time.

For SDG GEL466597, the bromofluorobenzene surrogate recoveries for samples B3MN25, B3MN19, B3MN31, B3MN28, B3MN24, B3MN20, B3MN24MS and B3MN24MSD were below the lower acceptance limit but ≥10%. The WTPH-G sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time. Since samples B3MN24MS and B3MN24MSD were QC samples, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32193-1, the MS and/or MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 3,3′-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenzo(a,h)anthracene, hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone and phenol were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32227-1, the MS and MSD recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methylnaphthalene, 2-nitroaniline, 2-nitrophenol, 3,3′-dichlorobenzidine, 3-nitroaniline, 4-chloroaniline, 4-chlorophenyl phenyl ether, acenaphthylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyoxy)methane, bis(2-chloroethyl)ether, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, isophorone, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine and phenol were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466527 the MS and MSD recoveries for WTPH-G were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time. See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466597 the MS and MSD recoveries for WTPH-G were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and would be

qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to missed holding time. See the table in Appendix 2 for a listing of affected samples

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32193-1, the LCS recoveries for 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32227-1, the LCS recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 3,3′-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

CRDLs for WTPH-D and WTPH-G were met.

- **Completeness**

SDGs SL32193-1, SL32227-1, GEL466527 and GEL466597 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage for methods 8270D and WTPH-D were 100%. The completion percentage for method WTPH-G was 0%

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of all sample results for WTPH-G as unusable were due to analysis beyond but within 2X the holding time. See the table in Appendix 2 for a listing of all affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to MS/MSD, LCS and surrogate recovery infractions. See the table in Appendix 2 for a listing of all affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL32193-1, SL32227-1, GEL466527, GEL466597	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 3,3′-dichlorobenzidine benzo(g,h,i)perylene, dibenz(a,h)anthracene, hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, phenol	UJ	B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316	Low matrix spike recoveries
4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, isophorone	UJ	B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316	Low matrix spike recoveries and low LCS recoveries
1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methylnaphthalene, 2-nitroaniline, 2-nitrophenol, 3-nitroaniline, 4-chlorophenyl phenyl ether, acenaphthylene, bis(2-chloroethoxy)methane, hexachlorobutadiene, hexachloroethane, naphthalene, nitrobenzene, n-nitrosodi-n-propylamine, phenol	UJ	B3L310, B3L322, B3L301, B3L325, B3L319, B3L307, B3L2Y2, B3L2Y5, B3L328, B3L340	Low matrix spike recoveries
1,2,4-trichlorobenzene,	UJ	B3L310, B3L322,	Low matrix spike

1,2-dichlorobenzene, 1,3-dichlorobenzene, 3,3′-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, isophorone		B3L301, B3L325, B3L319, B3L307, B3L2Y2, B3L2Y5, B3L328, B3L340	recoveries and low LCS recoveries
WTPH-G	UR	B3MN21, B3MN27, B3MN32, B3MN33, B3MN34, B3MN30, B3MN29, B3MN35, B3MN22	Analyzed beyond but within 2X the holding time and low matrix spike recoveries.
WTPH-G	UR	B3MN23, B3MN26, B3MN20, B3MN25, B3MN19, B3MN31, B3MN28, B3MN24	Analyzed beyond but within 2X the holding time, low surrogate recoveries and low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/25/19	
			SDG: SL32193-1, SL32227-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SL32193-1, B3L2Y8, B3L331, B3L304, B3L334, B3L337, B3L313, B3L316,					
SL32227-1, B3L310, B3L322, B3L301, B3L325, B3L319, B3L307, B3L2Y2, B3L2Y5, B3L328, B3L340,					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SL32193-1: B3L2Y8 NBZ 64%, B3L2Y8MS NBZ 68%, B3L304, NBZ 64%, B3L334 NBZ 64%, B3L337 NBZ 65%, B3L313 NBZ 57%, PHL 67%, B3L316 NBZ 67%, MB NBZ 67%

SL32227-1: B3L310 TBP 60%, FBP 68%, NBZ 52%, PHL 69%, B3L10MS NBZ 57%, PHL 67%, B3L310MSD 2FP 69%, NBZ 62%, PHL 68%, B3L301 NBZ 62%, B3L325 TBP 68%, NBZ 58%, B3L319 NBZ 65%, B3L307 TBP 67%, NBZ 62%, PHL 68%, B3L2Y2, TBP 69%, NBZ 63%, B3L2Y5, TBP 64%, FBP 69%, 2FP 65%, NBZ 51%, B3L328 NBZ 59% B3L340 NBZ 66%, MB TBP 69%, NBZ 61%

MS/MSD

SL32193-1: 1,2,4-trichlorobenzene 68% (MS), 1,2-dichlorobenzene 65% (MS), 1,3-dichlorobenzene 62%/68%, 1,4-dichlorobenzene 65% (MS), 3,3'-dichlorobenzidine 52%/54%, 4-chloroaniline 59%/61%, benzo(g,h,i)perylene 60%/58%, bis(2 chloro-1-methylethyl)ether 62%/65%, bis(2-chlorethyl)ether 59%/64%, dibenz(a,h)anthracene 64%/63%, hexachlorcyclopentadiene 63%/66%, hexachlorethane 62%/68%, indeno(1,2,3-cd)pyrene 66%/64%, isophorone 63%/64%, phenol 69% (MS),

MS/MSD and LCS information on last page.

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

MS/MSD

SL32227-1: 1,2,4-trichlorobenzene 59%/54%, 1,2-dichlorobenzene 60%/66%, 1,3-dichlorobenzene 56%/60%, 1,4-dichlorobenzene 56%/60%, 2,4,5-trichlorophenol 69% (MS), 2,4,6-trichlorophenol 67% (MSD), 2,4-dinitrophenol 65%, 2-chloronaphthalene 67% (MSD), 2-chlorophenol 69% (MS), 2-methylnaphthalene 69% (MSD), 2-nitroaniline 67% (MSD), 2-nitrophenol 66% (MSD), 3,3'-dichlorobenzidine 56%/49%, 3-nitroaniline 68%/67%, 4-chloroaniline 52%/53%, 4-chlorophenyl phenyl ether 64% (MSD), acenaphthylene 69%/69%, bis(2 chloro-1-methylethyl)ether 56%/58%, bis(2-chloroethyoxy)methane 66%/65%, bis(2-chloroethyl)ether 50%/52%, hexachlorobutadiene 59%/63%, hexachlorocyclopentadiene 53%/52%, hexachloroethane 58%/56%, isophorone 56%/53%, naphthalene 64%/65%, nitrobenzene 62%/64%, n-nitrosodi-n-propylamine 60%/64%, phenol 64%/68%,

LCS

SL32193-1: 4-chloroaniline 64%, bis(2 chloro-1-methylethyl)ether 69%, bis(2-chloroethyl)ether 66%, isophorone 68%

SL32227-1: 1,2,4-trichlorobenzene 64%, 1,2-dichlorobenzene 69%, 1,3-dichlorobenzene 67%, 3,3'-dichlorobenzidine 67%, 4-chloroaniline 61%, bis(2 chloro-1-methylethyl)ether 68%, bis(2-chloroethyl)ether 59%, hexachlorocyclopentadiene 64%, isophorone 66%

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/25/19	
			SDG: GEL466527, GEL466597		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	

SAMPLES/MATRIX: Soil
GEL466527: B3MN21, B3MN23, B3MN26, B3MN27, B3MN32, B3MN33, B3MN34
GEL466597: B3MN20, B3MN25, B3MN19, B3MN30, B3MN31, B3MN28, B3MN29, B3MN35, B3MN22, B3MN24

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

GEL466527: BFB B3MN23 56%, B3MN26 45%

GEL466597: BFB B3MN25 51%, B3MN19 56%, B3MN31 52%, B3MN28 58%, B3MN24 59%, B3MN24MS 53%, B3MN24MSD 59%, B3MN20 50%

MS/MSD

GEL466527: GRO 64%/57%

GEL466597: GRO 57%/45%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

GEL466527: GRO all samples analyzed 20 days after collection.

GEL466597 - GRO all samples analyzed 20 days after collection

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 407594

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 407601

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.4	U Z	58.4	61.3		ug/Kg	☼	105	62 - 118	13	20
4-Methyl-2-pentanone (MIBK)	3.3	U Z	58.4	64.5		ug/Kg	☼	111	73 - 125	0	20
Acetone	8.4	U Z T	58.4	116	T y	ug/Kg	☼	199	54 - 139	33	20
Benzene	0.33	U Z	58.4	62.2		ug/Kg	☼	107	80 - 120	1	20
Bromodichloromethane	0.64	U Z	58.4	63.0		ug/Kg	☼	108	80 - 120	3	20
Bromoform	2.5	U Z T	58.4	89.4	T	ug/Kg	☼	153	80 - 125	5	20
Bromomethane	3.1	U Z	58.4	55.0		ug/Kg	☼	94	70 - 126	0	20
Carbon disulfide	0.89	U Z	58.4	59.4		ug/Kg	☼	102	79 - 121	2	20
Carbon tetrachloride	0.66	U Z	58.4	61.0		ug/Kg	☼	104	80 - 120	6	20
Chlorobenzene	1.0	U Z	58.4	63.4		ug/Kg	☼	109	80 - 120	8	20
Chloroethane	2.5	U Z	58.4	54.2		ug/Kg	☼	93	64 - 133	2	20
Chloroform	0.49	U Z	58.4	62.2		ug/Kg	☼	106	80 - 120	1	20
Chloromethane	0.84	U Z	58.4	50.1		ug/Kg	☼	86	75 - 120	1	20
cis-1,3-Dichloropropene	2.7	U Z	58.4	64.8		ug/Kg	☼	111	80 - 120	5	20
Dibromochloromethane	1.6	U Z T	58.4	71.6	T	ug/Kg	☼	123	80 - 120	5	20
Ethylbenzene	0.89	U Z	58.4	63.8		ug/Kg	☼	109	80 - 120	13	20
Methylene Chloride	2.0	U Z	58.4	63.1		ug/Kg	☼	108	77 - 123	1	20
Styrene	2.5	U Z	58.4	63.3		ug/Kg	☼	108	80 - 120	17	20
Tetrachloroethene	0.73	U Z	58.4	60.8		ug/Kg	☼	104	80 - 120	16	20
Toluene	3.2	U Z	58.4	68.9		ug/Kg	☼	118	80 - 124	0	20
trans-1,3-Dichloropropene	2.2	U Z T	58.4	72.3	T	ug/Kg	☼	124	80 - 122	0	20
Trichloroethene	0.50	U Z	58.4	59.5		ug/Kg	☼	102	79 - 120	6	20
Vinyl chloride	0.56	U Z	58.4	55.1		ug/Kg	☼	94	71 - 120	3	20
Xylenes, Total	1.1	U Z	117	136		ug/Kg	☼	117	80 - 120	16	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*110*		*67 - 132*
4-Bromofluorobenzene (Surr)	*126*		*59 - 150*
Dibromofluoromethane (Surr)	*110*		*53 - 143*
Toluene-d8 (Surr)	*114*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Picoline	45	U	660	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthylene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acetophenone	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aniline	60	U	330	60	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Anthracene	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aramite	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Carbazole	47	U	330	47	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chrysene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diallate	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenzofuran	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diethylphthalate	82	U	330	82	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethoate	100	U	660	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dinoseb	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Disulfoton	41	U	1600	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Famphur	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluoranthene	50	U	330	50	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluorene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloroethane	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isodrin	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isophorone	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isosafrole	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Kepone	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methapyrilene	140	U	1600	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl parathion	120	U	1600	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Naphthalene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Nitrobenzene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Parathion	98	U	1600	98	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenacetin	54	U	660	54	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenanthrene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phorate	37	U	1600	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pronamide	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyrene	73	U	330	73	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyridine	71	U	660	71	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Safrole	33	U	660	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*331*	*N J*	*ug/Kg*		*4.24*	*141-79-7*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*13400*	*N*	*ug/Kg*		*4.58*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*431*	*N*	*ug/Kg*		*5.13*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
n-Hexadecanoic acid	*440*	*N J*	*ug/Kg*		*10.95*	*57-10-3*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
13-Tertadecen-1-ol acetate	*273*	*N J*	*ug/Kg*		*13.82*	*1000130-79-8*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*70*		*47 - 125*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorophenol (Surr)	*79*		*54 - 102*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Phenol-d5 (Surr)	*74*		*51 - 104*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Terphenyl-d14 (Surr)	*83*		*59 - 98*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2510		ug/Kg		75	58 - 101
1,2-Dichlorobenzene	3330	2510		ug/Kg		75	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2490		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2740		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2880		ug/Kg		87	56 - 110

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dichlorophenol	3330	2880		ug/Kg		86	57 - 99
2,4-Dimethylphenol	3330	2760		ug/Kg		83	53 - 97
2,4-Dinitrophenol	3330	2590		ug/Kg		78	10 - 89
2,4-Dinitrotoluene	3330	2900		ug/Kg		87	54 - 105
2,6-Dinitrotoluene	3330	2890		ug/Kg		87	55 - 105
2-Chloronaphthalene	3330	2730		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2780		ug/Kg		83	56 - 99
2-Methylnaphthalene	3330	2730		ug/Kg		82	58 - 98
2-Methylphenol	3330	2710		ug/Kg		81	53 - 97
2-Nitroaniline	3330	2720		ug/Kg		82	55 - 108
2-Nitrophenol	3330	2680		ug/Kg		81	59 - 104
3 & 4 Methylphenol	3330	3100		ug/Kg		93	58 - 108
3,3'-Dichlorobenzidine	3330	2380		ug/Kg		72	42 - 104
3-Nitroaniline	3330	2640		ug/Kg		79	43 - 96
4,6-Dinitro-2-methylphenol	3330	2980		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2900		ug/Kg		87	58 - 109
4-Chloro-3-methylphenol	3330	2810		ug/Kg		84	54 - 98
4-Chloroaniline	3330	2150		ug/Kg		64	41 - 83
4-Chlorophenyl phenyl ether	3330	2730		ug/Kg		82	55 - 105
4-Nitroaniline	3330	2710		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2810		ug/Kg		84	48 - 106
Acenaphthene	3330	2780		ug/Kg		83	55 - 106
Acenaphthylene	3330	2780		ug/Kg		83	56 - 109
Anthracene	3330	2870		ug/Kg		86	56 - 103
Benzo[a]anthracene	3330	2960		ug/Kg		89	56 - 107
Benzo[a]pyrene	3330	2820		ug/Kg		85	57 - 109
Benzo[b]fluoranthene	3330	2790		ug/Kg		84	68 - 109
Benzo[g,h,i]perylene	3330	2640		ug/Kg		79	51 - 126
Benzo[k]fluoranthene	3330	2720		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2290		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2520		ug/Kg		76	56 - 99
Bis(2-chloroethyl)ether	3330	2190		ug/Kg		66	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3140		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	3070		ug/Kg		92	60 - 112
Carbazole	3330	2990		ug/Kg		90	53 - 98
Chrysene	3330	2930		ug/Kg		88	54 - 107
Dibenz(a,h)anthracene	3330	2910		ug/Kg		87	52 - 126
Dibenzofuran	3330	2740		ug/Kg		82	55 - 103
Diethylphthalate	3330	2910		ug/Kg		87	54 - 101
Di-n-butyl phthalate	3330	3040		ug/Kg		91	57 - 102
Di-n-octyl phthalate	3330	3310		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3460		ug/Kg		104	63 - 121
Fluoranthene	3330	3010		ug/Kg		90	54 - 100
Fluorene	3330	2870		ug/Kg		86	57 - 106
Hexachlorobenzene	3330	2990		ug/Kg		90	57 - 109
Hexachlorobutadiene	3330	2740		ug/Kg		82	59 - 106
Hexachlorocyclopentadiene	3330	2440		ug/Kg		73	44 - 140

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachloroethane	3330	2420		ug/Kg		73	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2940		ug/Kg		88	52 - 132
Isophorone	3330	2260		ug/Kg		68	55 - 96
Naphthalene	3330	2610		ug/Kg		78	57 - 98
Nitrobenzene	3330	2530		ug/Kg		76	58 - 102
N-Nitrosodi-n-propylamine	3330	2530		ug/Kg		76	54 - 98
Pentachlorophenol	3330	2780		ug/Kg		83	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2550		ug/Kg		77	50 - 96
Pyrene	3330	2960		ug/Kg		89	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*86*		*54 - 102*
Nitrobenzene-d5 (Surr)	*77*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Lab Sample ID: 160-32193-8 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	37	U	3750	2560		ug/Kg	☼	68	52 - 103
1,2-Dichlorobenzene	39	U	3750	2440		ug/Kg	☼	65	50 - 98
1,3-Dichlorobenzene	41	U	3750	2310		ug/Kg	☼	62	49 - 96
1,4-Dichlorobenzene	42	U	3750	2440		ug/Kg	☼	65	50 - 96
2,4,5-Trichlorophenol	58	U	3750	3020		ug/Kg	☼	80	41 - 116
2,4,6-Trichlorophenol	51	U	3750	3080		ug/Kg	☼	82	40 - 115
2,4-Dichlorophenol	44	U	3750	3020		ug/Kg	☼	81	47 - 104
2,4-Dimethylphenol	62	U	3750	2920		ug/Kg	☼	78	45 - 105
2,4-Dinitrophenol	370	U	3750	2830		ug/Kg	☼	76	10 - 100
2,4-Dinitrotoluene	140	U	3750	3100		ug/Kg	☼	83	42 - 113
2,6-Dinitrotoluene	69	U	3750	3000		ug/Kg	☼	80	46 - 109
2-Chloronaphthalene	42	U	3750	2970		ug/Kg	☼	79	52 - 108
2-Chlorophenol	42	U	3750	2930		ug/Kg	☼	78	48 - 102
2-Methylnaphthalene	45	U	3750	2860		ug/Kg	☼	76	55 - 97
2-Methylphenol	47	U	3750	2840		ug/Kg	☼	76	46 - 98
2-Nitroaniline	130	U	3750	2780		ug/Kg	☼	74	45 - 111
2-Nitrophenol	160	U	3750	2770		ug/Kg	☼	74	38 - 115
3 & 4 Methylphenol	74	U	3750	3270		ug/Kg	☼	87	48 - 111
3,3'-Dichlorobenzidine	130	U	3750	1940		ug/Kg	☼	52	23 - 102
3-Nitroaniline	110	U	3750	2640		ug/Kg	☼	70	32 - 95
4,6-Dinitro-2-methylphenol	370	U	3750	3160		ug/Kg	☼	84	15 - 118
4-Bromophenyl phenyl ether	54	U	3750	3010		ug/Kg	☼	80	53 - 110
4-Chloro-3-methylphenol	47	U	3750	2970		ug/Kg	☼	79	36 - 111
4-Chloroaniline	52	U	3750	2210		ug/Kg	☼	59	32 - 79

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32193-8 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorophenyl phenyl ether	48	U	3750	2980		ug/Kg	☼	79	51 - 103
4-Nitroaniline	83	U	3750	2790		ug/Kg	☼	74	36 - 102
4-Nitrophenol	370	U	3750	2920		ug/Kg	☼	78	40 - 113
Acenaphthene	39	U	3750	3000		ug/Kg	☼	80	53 - 105
Acenaphthylene	51	U	3750	2940		ug/Kg	☼	78	55 - 107
Anthracene	55	U	3750	3090		ug/Kg	☼	82	55 - 103
Benzo[a]anthracene	66	U	3750	3040		ug/Kg	☼	81	48 - 112
Benzo[a]pyrene	99	U	3750	2900		ug/Kg	☼	77	46 - 117
Benzo[b]fluoranthene	37	U	3750	2880		ug/Kg	☼	77	45 - 125
Benzo[g,h,i]perylene	37	U	3750	2270		ug/Kg	☼	60	24 - 134
Benzo[k]fluoranthene	89	U	3750	2860		ug/Kg	☼	76	43 - 114
bis(2 chloro-1-methylethyl) ether	47	U	3750	2330		ug/Kg	☼	62	38 - 98
Bis(2-chloroethoxy)methane	42	U	3750	2610		ug/Kg	☼	70	49 - 100
Bis(2-chloroethyl)ether	37	U	3750	2220		ug/Kg	☼	59	49 - 100
Bis(2-ethylhexyl) phthalate	95	U	3750	3270		ug/Kg	☼	87	50 - 113
Butyl benzyl phthalate	100	U	3750	3200		ug/Kg	☼	85	54 - 112
Carbazole	53	U	3750	3110		ug/Kg	☼	83	47 - 102
Chrysene	51	U	3750	2980		ug/Kg	☼	79	45 - 115
Dibenz(a,h)anthracene	73	U	3750	2400		ug/Kg	☼	64	30 - 134
Dibenzofuran	45	U	3750	3000		ug/Kg	☼	80	50 - 102
Diethylphthalate	91	U	3750	3090		ug/Kg	☼	82	46 - 107
Di-n-butyl phthalate	71	U	3750	3220		ug/Kg	☼	86	49 - 107
Di-n-octyl phthalate	150	U	3750	3520		ug/Kg	☼	94	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	37	U	3750	3590		ug/Kg	☼	96	33 - 140
Fluoranthene	56	U	3750	3110		ug/Kg	☼	83	45 - 109
Fluorene	51	U	3750	3090		ug/Kg	☼	82	45 - 109
Hexachlorobenzene	47	U	3750	2990		ug/Kg	☼	80	48 - 113
Hexachlorobutadiene	44	U	3750	2830		ug/Kg	☼	75	48 - 109
Hexachlorocyclopentadiene	370	U	3750	2370		ug/Kg	☼	63	21 - 144
Hexachloroethane	38	U	3750	2330		ug/Kg	☼	62	44 - 102
Indeno[1,2,3-cd]pyrene	70	U	3750	2470		ug/Kg	☼	66	30 - 136
Isophorone	42	U	3750	2350		ug/Kg	☼	63	48 - 100
Naphthalene	39	U	3750	2680		ug/Kg	☼	71	54 - 98
Nitrobenzene	45	U	3750	2610		ug/Kg	☼	70	51 - 106
N-Nitrosodi-n-propylamine	45	U	3750	2700		ug/Kg	☼	72	47 - 104
Pentachlorophenol	370	U	3750	2680		ug/Kg	☼	71	23 - 116
Phenanthrene	47	U	3750	3040		ug/Kg	☼	81	53 - 106
Phenol	42	U	3750	2610		ug/Kg	☼	69	41 - 100
Pyrene	81	U	3750	3040		ug/Kg	☼	81	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*85*		*47 - 125*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*
2-Fluorophenol (Surr)	*78*		*54 - 102*
Nitrobenzene-d5 (Surr)	*68*		*44 - 120*
Phenol-d5 (Surr)	*72*		*51 - 104*
Terphenyl-d14 (Surr)	*85*		*59 - 98*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	37	U	3700	2730		ug/Kg	☼	74	52 - 103	6	30
1,2-Dichlorobenzene	39	U	3700	2700		ug/Kg	☼	73	50 - 98	10	30
1,3-Dichlorobenzene	41	U	3700	2520		ug/Kg	☼	68	49 - 96	9	30
1,4-Dichlorobenzene	42	U	3700	2670		ug/Kg	☼	72	50 - 96	9	30
2,4,5-Trichlorophenol	58	U	3700	2940		ug/Kg	☼	79	41 - 116	3	30
2,4,6-Trichlorophenol	51	U	3700	3010		ug/Kg	☼	82	40 - 115	2	30
2,4-Dichlorophenol	44	U	3700	3090		ug/Kg	☼	84	47 - 104	2	30
2,4-Dimethylphenol	62	U	3700	2900		ug/Kg	☼	78	45 - 105	1	30
2,4-Dinitrophenol	370	U	3700	2840		ug/Kg	☼	77	10 - 100	0	30
2,4-Dinitrotoluene	140	U	3700	2980		ug/Kg	☼	81	42 - 113	4	30
2,6-Dinitrotoluene	69	U	3700	2920		ug/Kg	☼	79	46 - 109	3	30
2-Chloronaphthalene	42	U	3700	2920		ug/Kg	☼	79	52 - 108	2	30
2-Chlorophenol	42	U	3700	2980		ug/Kg	☼	81	48 - 102	2	30
2-Methylnaphthalene	45	U	3700	2930		ug/Kg	☼	79	55 - 97	2	30
2-Methylphenol	47	U	3700	2940		ug/Kg	☼	79	46 - 98	3	30
2-Nitroaniline	130	U	3700	2770		ug/Kg	☼	75	45 - 111	0	30
2-Nitrophenol	160	U	3700	2810		ug/Kg	☼	76	38 - 115	1	30
3 & 4 Methylphenol	74	U	3700	3480		ug/Kg	☼	94	48 - 111	6	30
3,3'-Dichlorobenzidine	130	U	3700	1990		ug/Kg	☼	54	23 - 102	2	30
3-Nitroaniline	110	U	3700	2660		ug/Kg	☼	72	32 - 95	1	30
4,6-Dinitro-2-methylphenol	370	U	3700	3260		ug/Kg	☼	88	15 - 118	3	30
4-Bromophenyl phenyl ether	54	U	3700	3100		ug/Kg	☼	84	53 - 110	3	30
4-Chloro-3-methylphenol	47	U	3700	3050		ug/Kg	☼	83	36 - 111	3	30
4-Chloroaniline	52	U	3700	2250		ug/Kg	☼	61	32 - 79	2	30
4-Chlorophenyl phenyl ether	48	U	3700	3010		ug/Kg	☼	81	51 - 103	1	30
4-Nitroaniline	83	U	3700	2810		ug/Kg	☼	76	36 - 102	1	30
4-Nitrophenol	370	U	3700	2910		ug/Kg	☼	79	40 - 113	0	30
Acenaphthene	39	U	3700	2930		ug/Kg	☼	79	53 - 105	2	30
Acenaphthylene	51	U	3700	2900		ug/Kg	☼	78	55 - 107	1	30
Anthracene	55	U	3700	3060		ug/Kg	☼	83	55 - 103	1	30
Benzo[a]anthracene	66	U	3700	3100		ug/Kg	☼	84	48 - 112	2	30
Benzo[a]pyrene	99	U	3700	2900		ug/Kg	☼	78	46 - 117	0	30
Benzo[b]fluoranthene	37	U	3700	2930		ug/Kg	☼	79	45 - 125	2	30
Benzo[g,h,i]perylene	37	U	3700	2140		ug/Kg	☼	58	24 - 134	6	30
Benzo[k]fluoranthene	89	U	3700	2780		ug/Kg	☼	75	43 - 114	3	30
bis(2 chloro-1-methylethyl) ether	47	U	3700	2410		ug/Kg	☼	65	38 - 98	4	30
Bis(2-chloroethoxy)methane	42	U	3700	2640		ug/Kg	☼	71	49 - 100	1	30
Bis(2-chloroethyl)ether	37	U	3700	2360		ug/Kg	☼	64	49 - 100	6	30
Bis(2-ethylhexyl) phthalate	95	U	3700	3390		ug/Kg	☼	92	50 - 113	3	30
Butyl benzyl phthalate	100	U	3700	3220		ug/Kg	☼	87	54 - 112	1	30
Carbazole	53	U	3700	3110		ug/Kg	☼	84	47 - 102	0	30
Chrysene	51	U	3700	3100		ug/Kg	☼	84	45 - 115	4	30
Dibenz(a,h)anthracene	73	U	3700	2310		ug/Kg	☼	63	30 - 134	4	30
Dibenzofuran	45	U	3700	2960		ug/Kg	☼	80	50 - 102	1	30
Diethylphthalate	91	U	3700	3080		ug/Kg	☼	83	46 - 107	0	30
Di-n-butyl phthalate	71	U	3700	3220		ug/Kg	☼	87	49 - 107	0	30
Di-n-octyl phthalate	150	U	3700	3530		ug/Kg	☼	96	35 - 125	0	30
Diphenylamine + N-Nitrosodiphenylamine	37	U	3700	3580		ug/Kg	☼	97	33 - 140	0	30
Fluoranthene	56	U	3700	3190		ug/Kg	☼	86	45 - 109	3	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	51	U	3700	3030		ug/Kg	☼	82	45 - 109	2	30
Hexachlorobenzene	47	U	3700	3210		ug/Kg	☼	87	48 - 113	7	30
Hexachlorobutadiene	44	U	3700	2950		ug/Kg	☼	80	48 - 109	4	30
Hexachlorocyclopentadiene	370	U	3700	2450		ug/Kg	☼	66	21 - 144	3	30
Hexachloroethane	38	U	3700	2510		ug/Kg	☼	68	44 - 102	8	30
Indeno[1,2,3-cd]pyrene	70	U	3700	2380		ug/Kg	☼	64	30 - 136	4	30
Isophorone	42	U	3700	2370		ug/Kg	☼	64	48 - 100	1	30
Naphthalene	39	U	3700	2780		ug/Kg	☼	75	54 - 98	4	30
Nitrobenzene	45	U	3700	2670		ug/Kg	☼	72	51 - 106	2	30
N-Nitrosodi-n-propylamine	45	U	3700	2800		ug/Kg	☼	76	47 - 104	4	30
Pentachlorophenol	370	U	3700	2740		ug/Kg	☼	74	23 - 116	2	30
Phenanthrene	47	U	3700	3060		ug/Kg	☼	83	53 - 106	1	30
Phenol	42	U	3700	2750		ug/Kg	☼	74	41 - 100	5	30
Pyrene	81	U	3700	3130		ug/Kg	☼	85	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*83*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*72*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*88*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32193-8	B3L2Y8	107	120	106	110
160-32193-8 MS	B3L2Y8	105	107	104	111
160-32193-8 MSD	B3L2Y8	110	126	110	114
160-32193-9	B3L331	108	119	107	109
160-32193-10	B3L304	111	128	108	116
160-32193-11	B3L334	111	103	106	103
160-32193-12	B3L337	117	105	105	105
160-32193-13	B3L313	122	136	114	121
160-32193-14	B3L316	115	102	105	103
160-32193-15	B3L344	116	101	108	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-407594/5	Lab Control Sample	102	98	102	102
LCSD 160-407594/6	Lab Control Sample Dup	98	100	101	104
MB 160-407594/8	Method Blank	105	99	103	104

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32193-8	B3L2Y8	72	76	78	64	73	78
160-32193-8 MS	B3L2Y8	85	80	78	68	72	85
160-32193-8 MSD	B3L2Y8	83	81	84	72	76	88
160-32193-9	B3L331	87	85	85	70	80	84
160-32193-10	B3L304	84	81	79	64	75	85
160-32193-11	B3L334	81	82	79	64	78	86
160-32193-12	B3L337	85	84	78	65	74	85
160-32193-13 - DL	B3L313	75	75	77	57	67	81
160-32193-14	B3L316	82	81	81	67	76	86

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32193-1	B3L330	105	73
160-32193-1 MS	B3L330	91	71
160-32193-1 MSD	B3L330	92	77
160-32193-3	B3L303	98	85
160-32193-4	B3L336	103	82
160-32193-5	B3L315	103	85
160-32193-6	B3L2Y7	93	79
160-32193-7	B3L312	89	78

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32193-2	B3L333	99	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405791/1-A
Matrix: Solid
Analysis Batch: 406251

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405791

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Methylphenol	42	U	330	42	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
2-Picoline	45	U	660	45	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Acenaphthene	35	U	330	35	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Acenaphthylene	46	U	330	46	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Acetophenone	34	U	330	34	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Aniline	60	U	330	60	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Anthracene	49	U	330	49	ug/Kg		12/14/18 10:48	12/18/18 17:48	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405791/1-A
Matrix: Solid
Analysis Batch: 406251

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405791

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aramite	330	U	660	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Carbazole	47	U	330	47	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Chrysene	46	U	330	46	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Diallate	67	U	660	67	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Dibenzofuran	41	U	330	41	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Diethylphthalate	82	U	330	82	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Dimethoate	100	U	660	100	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Dinoseb	330	U	660	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Disulfoton	41	U	1600	41	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Famphur	33	U	3300	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Fluoranthene	50	U	330	50	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Fluorene	46	U	330	46	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachloroethane	35	U	330	35	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Isodrin	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Isophorone	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Isosafrole	67	U	660	67	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Kepone	330	U	3300	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Methapyrilene	140	U	1600	140	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Methyl parathion	120	U	1600	120	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Naphthalene	35	U	330	35	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Nitrobenzene	40	U	330	40	ug/Kg		12/14/18 10:48	12/18/18 17:48	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405791/1-A
Matrix: Solid
Analysis Batch: 406251

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405791

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
o-Toluidine	51	U	330	51	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Parathion	98	U	1600	98	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Phenacetin	54	U	660	54	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Phenanthrene	42	U	330	42	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Phenol	38	U	330	38	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Phorate	37	U	1600	37	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pronamide	53	U	660	53	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pyrene	73	U	330	73	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Pyridine	71	U	660	71	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Safrole	33	U	660	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/14/18 10:48	12/18/18 17:48	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/14/18 10:48	12/18/18 17:48	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*311*	*N J*	*ug/Kg*		*4.25*	*141-79-7*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
Unknown	*12600*	*N*	*ug/Kg*		*4.59*		*12/14/18 10:48*	*12/18/18 17:48*	*1*
Unknown	*385*	*N*	*ug/Kg*		*5.13*		*12/14/18 10:48*	*12/18/18 17:48*	*1*
n-Hexadecanoic acid	*477*	*N J*	*ug/Kg*		*10.97*	*57-10-3*	*12/14/18 10:48*	*12/18/18 17:48*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*69*		*47 - 125*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
2-Fluorobiphenyl (Surr)	*75*		*59 - 110*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
2-Fluorophenol (Surr)	*75*		*54 - 102*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
Nitrobenzene-d5 (Surr)	*61*		*44 - 120*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
Phenol-d5 (Surr)	*71*		*51 - 104*	*12/14/18 10:48*	*12/18/18 17:48*	*1*
Terphenyl-d14 (Surr)	*81*		*59 - 98*	*12/14/18 10:48*	*12/18/18 17:48*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405791/2-A
Matrix: Solid
Analysis Batch: 406251

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2130		ug/Kg		64	58 - 101
1,2-Dichlorobenzene	3330	2290		ug/Kg		69	57 - 99
1,3-Dichlorobenzene	3330	2230		ug/Kg		67	55 - 98
1,4-Dichlorobenzene	3330	2350		ug/Kg		70	56 - 98
2,4,5-Trichlorophenol	3330	2460		ug/Kg		74	56 - 109
2,4,6-Trichlorophenol	3330	2490		ug/Kg		75	56 - 110
2,4-Dichlorophenol	3330	2660		ug/Kg		80	57 - 99
2,4-Dimethylphenol	3330	2590		ug/Kg		78	53 - 97
2,4-Dinitrophenol	3330	2340		ug/Kg		70	10 - 89
2,4-Dinitrotoluene	3330	2670		ug/Kg		80	54 - 105
2,6-Dinitrotoluene	3330	2690		ug/Kg		81	55 - 105
2-Chloronaphthalene	3330	2540		ug/Kg		76	56 - 111
2-Chlorophenol	3330	2510		ug/Kg		75	56 - 99
2-Methylnaphthalene	3330	2550		ug/Kg		76	58 - 98
2-Methylphenol	3330	2550		ug/Kg		76	53 - 97
2-Nitroaniline	3330	2490		ug/Kg		75	55 - 108
2-Nitrophenol	3330	2560		ug/Kg		77	59 - 104
3 & 4 Methylphenol	3330	2950		ug/Kg		89	58 - 108
3,3'-Dichlorobenzidine	3330	2230		ug/Kg		67	42 - 104
3-Nitroaniline	3330	2440		ug/Kg		73	43 - 96
4,6-Dinitro-2-methylphenol	3330	3000		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2680		ug/Kg		80	54 - 98
4-Chloroaniline	3330	2040		ug/Kg		61	41 - 83
4-Chlorophenyl phenyl ether	3330	2430		ug/Kg		73	55 - 105
4-Nitroaniline	3330	2570		ug/Kg		77	49 - 99
4-Nitrophenol	3330	2570		ug/Kg		77	48 - 106
Acenaphthene	3330	2600		ug/Kg		78	55 - 106
Acenaphthylene	3330	2550		ug/Kg		77	56 - 109
Anthracene	3330	2810		ug/Kg		84	56 - 103
Benzo[a]anthracene	3330	2900		ug/Kg		87	56 - 107
Benzo[a]pyrene	3330	2750		ug/Kg		83	57 - 109
Benzo[b]fluoranthene	3330	2720		ug/Kg		82	68 - 109
Benzo[g,h,i]perylene	3330	2640		ug/Kg		79	51 - 126
Benzo[k]fluoranthene	3330	2620		ug/Kg		79	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2270		ug/Kg		68	49 - 94
Bis(2-chloroethoxy)methane	3330	2360		ug/Kg		71	56 - 99
Bis(2-chloroethyl)ether	3330	1970		ug/Kg		59	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3380		ug/Kg		101	59 - 113
Butyl benzyl phthalate	3330	3250		ug/Kg		97	60 - 112
Carbazole	3330	3040		ug/Kg		91	53 - 98
Chrysene	3330	2840		ug/Kg		85	54 - 107
Dibenz(a,h)anthracene	3330	2850		ug/Kg		86	52 - 126
Dibenzofuran	3330	2600		ug/Kg		78	55 - 103
Diethylphthalate	3330	2830		ug/Kg		85	54 - 101
Di-n-butyl phthalate	3330	3240		ug/Kg		97	57 - 102
Di-n-octyl phthalate	3330	3730		ug/Kg		112	56 - 117

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405791/2-A
Matrix: Solid
Analysis Batch: 406251

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diphenylamine + N-Nitrosodiphenylamine	3330	3710		ug/Kg		111	63 - 121
Fluoranthene	3330	2920		ug/Kg		88	54 - 100
Fluorene	3330	2690		ug/Kg		81	57 - 106
Hexachlorobenzene	3330	2880		ug/Kg		86	57 - 109
Hexachlorobutadiene	3330	2340		ug/Kg		70	59 - 106
Hexachlorocyclopentadiene	3330	2120		ug/Kg		64	44 - 140
Hexachloroethane	3330	2320		ug/Kg		70	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2880		ug/Kg		87	52 - 132
Isophorone	3330	2190		ug/Kg		66	55 - 96
Naphthalene	3330	2480		ug/Kg		74	57 - 98
Nitrobenzene	3330	2430		ug/Kg		73	58 - 102
N-Nitrosodi-n-propylamine	3330	2430		ug/Kg		73	54 - 98
Pentachlorophenol	3330	2630		ug/Kg		79	35 - 107
Phenanthrene	3330	2840		ug/Kg		85	57 - 103
Phenol	3330	2400		ug/Kg		72	50 - 96
Pyrene	3330	2730		ug/Kg		82	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*78*		*47 - 125*
2-Fluorobiphenyl (Surr)	*78*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*73*		*44 - 120*
Phenol-d5 (Surr)	*72*		*51 - 104*
Terphenyl-d14 (Surr)	*84*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-32227-11 MS
Matrix: Soil
Analysis Batch: 406251

Client Sample ID: B3L310
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	180	U D	3610	2140	D	ug/Kg	☼	59	52 - 103
1,2-Dichlorobenzene - DL	190	U D	3610	2160	D	ug/Kg	☼	60	50 - 98
1,3-Dichlorobenzene - DL	200	U D	3610	2020	D	ug/Kg	☼	56	49 - 96
1,4-Dichlorobenzene - DL	200	U D	3610	2020	D	ug/Kg	☼	56	50 - 96
2,4,5-Trichlorophenol - DL	280	U D	3610	2500	D	ug/Kg	☼	69	41 - 116
2,4,6-Trichlorophenol - DL	250	U D	3610	2740	D	ug/Kg	☼	76	40 - 115
2,4-Dichlorophenol - DL	210	U D	3610	2680	D	ug/Kg	☼	74	47 - 104
2,4-Dimethylphenol - DL	300	U D	3610	2780	D	ug/Kg	☼	77	45 - 105
2,4-Dinitrophenol - DL	1800	U D	3610	2650	J D	ug/Kg	☼	73	10 - 100
2,4-Dinitrotoluene - DL	690	U D	3610	2790	D	ug/Kg	☼	77	42 - 113
2,6-Dinitrotoluene - DL	340	U D	3610	2610	D	ug/Kg	☼	72	46 - 109
2-Chloronaphthalene - DL	200	U D	3610	2650	D	ug/Kg	☼	73	52 - 108
2-Chlorophenol - DL	210	U D	3610	2480	D	ug/Kg	☼	69	48 - 102
2-Methylnaphthalene - DL	220	U D	3610	2520	D	ug/Kg	☼	70	55 - 97
2-Methylphenol - DL	230	U D	3610	2540	D	ug/Kg	☼	70	46 - 98

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32227-11 MS
Matrix: Soil
Analysis Batch: 406251

Client Sample ID: B3L310
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitroaniline - DL	650	U D	3610	2650	D	ug/Kg	☼	73	45 - 111
2-Nitrophenol - DL	780	U D	3610	2660	D	ug/Kg	☼	74	38 - 115
3 & 4 Methylphenol - DL	360	U D	3610	2880	J D	ug/Kg	☼	80	48 - 111
3,3'-Dichlorobenzidine - DL	610	U D	3610	2030	J D	ug/Kg	☼	56	23 - 102
3-Nitroaniline - DL	560	U D	3610	2470	D	ug/Kg	☼	68	32 - 95
4,6-Dinitro-2-methylphenol - DL	1800	U D	3610	3120	J D	ug/Kg	☼	86	15 - 118
4-Bromophenyl phenyl ether - DL	270	U D	3610	2670	D	ug/Kg	☼	74	53 - 110
4-Chloro-3-methylphenol - DL	230	U D	3610	2820	D	ug/Kg	☼	78	36 - 111
4-Chloroaniline - DL	250	U D	3610	1890	D	ug/Kg	☼	52	32 - 79
4-Chlorophenyl phenyl ether - DL	240	U D	3610	2540	D	ug/Kg	☼	70	51 - 103
4-Nitroaniline - DL	410	U D	3610	2560	J D	ug/Kg	☼	71	36 - 102
4-Nitrophenol - DL	1800	U D	3610	2840	J D	ug/Kg	☼	79	40 - 113
Acenaphthene - DL	190	U D	3610	2610	D	ug/Kg	☼	72	53 - 105
Acenaphthylene - DL	250	U D	3610	2490	D	ug/Kg	☼	69	55 - 107
Anthracene - DL	270	U D	3610	2760	D	ug/Kg	☼	76	55 - 103
Benzo[a]anthracene - DL	320	U D	3610	2950	D	ug/Kg	☼	82	48 - 112
Benzo[a]pyrene - DL	490	U D	3610	2930	D	ug/Kg	☼	81	46 - 117
Benzo[b]fluoranthene - DL	180	U D	3610	2850	D	ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene - DL	180	U D	3610	4120	D	ug/Kg	☼	114	24 - 134
Benzo[k]fluoranthene - DL	440	U D	3610	2770	D	ug/Kg	☼	77	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	230	U D	3610	2020	D	ug/Kg	☼	56	38 - 98
Bis(2-chloroethoxy)methane - DL	200	U D	3610	2390	D	ug/Kg	☼	66	49 - 100
Bis(2-chloroethyl)ether - DL	180	U D	3610	1810	D	ug/Kg	☼	50	49 - 100
Bis(2-ethylhexyl) phthalate - DL	460	U D	3610	3520	D	ug/Kg	☼	97	50 - 113
Butyl benzyl phthalate - DL	500	U D	3610	3400	D	ug/Kg	☼	94	54 - 112
Carbazole - DL	260	U D	3610	3000	D	ug/Kg	☼	83	47 - 102
Chrysene - DL	250	U D	3610	2910	D	ug/Kg	☼	81	45 - 115
Dibenz(a,h)anthracene - DL	360	U D	3610	3670	D	ug/Kg	☼	102	30 - 134
Dibenzofuran - DL	220	U D	3610	2690	D	ug/Kg	☼	75	50 - 102
Diethylphthalate - DL	450	U D	3610	2940	D	ug/Kg	☼	81	46 - 107
Di-n-butyl phthalate - DL	350	U D	3610	3200	D	ug/Kg	☼	88	49 - 107
Di-n-octyl phthalate - DL	720	U D	3610	3810	D	ug/Kg	☼	106	35 - 125
Diphenylamine + N-Nitrosodiphenylamine - DL	180	U D	3610	3670	D	ug/Kg	☼	102	33 - 140
Fluoranthene - DL	270	U D	3610	2950	D	ug/Kg	☼	82	45 - 109
Fluorene - DL	250	U D	3610	2790	D	ug/Kg	☼	77	45 - 109
Hexachlorobenzene - DL	230	U D	3610	2780	D	ug/Kg	☼	77	48 - 113
Hexachlorobutadiene - DL	220	U D	3610	2130	D	ug/Kg	☼	59	48 - 109
Hexachlorocyclopentadiene - DL	1800	U D	3610	1900	J D	ug/Kg	☼	53	21 - 144
Hexachloroethane - DL	190	U D	3610	2090	D	ug/Kg	☼	58	44 - 102
Indeno[1,2,3-cd]pyrene - DL	340	U D	3610	3960	D	ug/Kg	☼	110	30 - 136
Isophorone - DL	200	U D	3610	2010	D	ug/Kg	☼	56	48 - 100
Naphthalene - DL	190	U D	3610	2310	D	ug/Kg	☼	64	54 - 98
Nitrobenzene - DL	220	U D	3610	2250	D	ug/Kg	☼	62	51 - 106
N-Nitrosodi-n-propylamine - DL	220	U D	3610	2170	D	ug/Kg	☼	60	47 - 104
Pentachlorophenol - DL	1800	U D	3610	2810	J D	ug/Kg	☼	78	23 - 116
Phenanthrene - DL	230	U D	3610	2850	D	ug/Kg	☼	79	53 - 106
Phenol - DL	210	U D	3610	2300	D	ug/Kg	☼	64	41 - 100

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32227-11 MS
Matrix: Soil
Analysis Batch: 406251

Client Sample ID: B3L310
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Pyrene - DL	400	U D	3610	2840	D	ug/Kg	☼	79	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*77*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*74*		*59 - 110*
2-Fluorophenol (Surr) - DL	*71*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*57*		*44 - 120*
Phenol-d5 (Surr) - DL	*67*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*80*		*59 - 98*

Lab Sample ID: 160-32227-11 MSD
Matrix: Soil
Analysis Batch: 406251

Client Sample ID: B3L310
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	180	U D	3620	1970	D	ug/Kg	☼	54	52 - 103	8	30
1,2-Dichlorobenzene - DL	190	U D	3620	2380	D	ug/Kg	☼	66	50 - 98	10	30
1,3-Dichlorobenzene - DL	200	U D	3620	2160	D	ug/Kg	☼	60	49 - 96	7	30
1,4-Dichlorobenzene - DL	200	U D	3620	2190	D	ug/Kg	☼	60	50 - 96	8	30
2,4,5-Trichlorophenol - DL	280	U D	3620	2610	D	ug/Kg	☼	72	41 - 116	4	30
2,4,6-Trichlorophenol - DL	250	U D	3620	2410	D	ug/Kg	☼	67	40 - 115	13	30
2,4-Dichlorophenol - DL	210	U D	3620	2810	D	ug/Kg	☼	78	47 - 104	5	30
2,4-Dimethylphenol - DL	300	U D	3620	2620	D	ug/Kg	☼	72	45 - 105	6	30
2,4-Dinitrophenol - DL	1800	U D	3620	2360	J D	ug/Kg	☼	65	10 - 100	11	30
2,4-Dinitrotoluene - DL	690	U D	3620	2770	D	ug/Kg	☼	76	42 - 113	1	30
2,6-Dinitrotoluene - DL	340	U D	3620	2600	D	ug/Kg	☼	72	46 - 109	0	30
2-Chloronaphthalene - DL	200	U D	3620	2430	D	ug/Kg	☼	67	52 - 108	9	30
2-Chlorophenol - DL	210	U D	3620	2610	D	ug/Kg	☼	72	48 - 102	5	30
2-Methylnaphthalene - DL	220	U D	3620	2490	D	ug/Kg	☼	69	55 - 97	1	30
2-Methylphenol - DL	230	U D	3620	2710	D	ug/Kg	☼	75	46 - 98	6	30
2-Nitroaniline - DL	650	U D	3620	2440	D	ug/Kg	☼	67	45 - 111	8	30
2-Nitrophenol - DL	780	U D	3620	2380	D	ug/Kg	☼	66	38 - 115	11	30
3 & 4 Methylphenol - DL	360	U D	3620	3170	J D	ug/Kg	☼	88	48 - 111	9	30
3,3'-Dichlorobenzidine - DL	610	U D	3620	1790	J D	ug/Kg	☼	49	23 - 102	13	30
3-Nitroaniline - DL	560	U D	3620	2410	D	ug/Kg	☼	67	32 - 95	2	30
4,6-Dinitro-2-methylphenol - DL	1800	U D	3620	3120	J D	ug/Kg	☼	86	15 - 118	0	30
4-Bromophenyl phenyl ether - DL	270	U D	3620	2830	D	ug/Kg	☼	78	53 - 110	6	30
4-Chloro-3-methylphenol - DL	230	U D	3620	2780	D	ug/Kg	☼	77	36 - 111	1	30
4-Chloroaniline - DL	250	U D	3620	1920	D	ug/Kg	☼	53	32 - 79	2	30
4-Chlorophenyl phenyl ether - DL	240	U D	3620	2300	D	ug/Kg	☼	64	51 - 103	10	30
4-Nitroaniline - DL	410	U D	3620	2530	J D	ug/Kg	☼	70	36 - 102	1	30
4-Nitrophenol - DL	1800	U D	3620	2840	J D	ug/Kg	☼	78	40 - 113	0	30
Acenaphthene - DL	190	U D	3620	2560	D	ug/Kg	☼	71	53 - 105	2	30
Acenaphthylene - DL	250	U D	3620	2500	D	ug/Kg	☼	69	55 - 107	0	30
Anthracene - DL	270	U D	3620	2680	D	ug/Kg	☼	74	55 - 103	3	30
Benzo[a]anthracene - DL	320	U D	3620	2750	D	ug/Kg	☼	76	48 - 112	7	30
Benzo[a]pyrene - DL	490	U D	3620	2770	D	ug/Kg	☼	76	46 - 117	6	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-32227-11 MSD
Matrix: Soil
Analysis Batch: 406251

Client Sample ID: B3L310
Prep Type: Total/NA
Prep Batch: 405791

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzo[b]fluoranthene - DL	180	U D	3620	2740	D	ug/Kg	☼	76	45 - 125	4	30
Benzo[g,h,i]perylene - DL	180	U D	3620	4010	D	ug/Kg	☼	111	24 - 134	3	30
Benzo[k]fluoranthene - DL	440	U D	3620	2720	D	ug/Kg	☼	75	43 - 114	2	30
bis(2 chloro-1-methylethyl) ether - DL	230	U D	3620	2090	D	ug/Kg	☼	58	38 - 98	4	30
Bis(2-chloroethoxy)methane - DL	200	U D	3620	2340	D	ug/Kg	☼	65	49 - 100	2	30
Bis(2-chloroethyl)ether - DL	180	U D	3620	1880	D	ug/Kg	☼	52	49 - 100	4	30
Bis(2-ethylhexyl) phthalate - DL	460	U D	3620	3370	D	ug/Kg	☼	93	50 - 113	4	30
Butyl benzyl phthalate - DL	500	U D	3620	3230	D	ug/Kg	☼	89	54 - 112	5	30
Carbazole - DL	260	U D	3620	2950	D	ug/Kg	☼	82	47 - 102	2	30
Chrysene - DL	250	U D	3620	2750	D	ug/Kg	☼	76	45 - 115	6	30
Dibenz(a,h)anthracene - DL	360	U D	3620	3530	D	ug/Kg	☼	98	30 - 134	4	30
Dibenzofuran - DL	220	U D	3620	2620	D	ug/Kg	☼	72	50 - 102	3	30
Diethylphthalate - DL	450	U D	3620	2880	D	ug/Kg	☼	80	46 - 107	2	30
Di-n-butyl phthalate - DL	350	U D	3620	3220	D	ug/Kg	☼	89	49 - 107	1	30
Di-n-octyl phthalate - DL	720	U D	3620	3450	D	ug/Kg	☼	95	35 - 125	10	30
Diphenylamine + N-Nitrosodiphenylamine - DL	180	U D	3620	3590	D	ug/Kg	☼	99	33 - 140	2	30
Fluoranthene - DL	270	U D	3620	2850	D	ug/Kg	☼	79	45 - 109	4	30
Fluorene - DL	250	U D	3620	2720	D	ug/Kg	☼	75	45 - 109	3	30
Hexachlorobenzene - DL	230	U D	3620	2670	D	ug/Kg	☼	74	48 - 113	4	30
Hexachlorobutadiene - DL	220	U D	3620	2290	D	ug/Kg	☼	63	48 - 109	7	30
Hexachlorocyclopentadiene - DL	1800	U D	3620	1900	J D	ug/Kg	☼	52	21 - 144	0	30
Hexachloroethane - DL	190	U D	3620	2040	D	ug/Kg	☼	56	44 - 102	2	30
Indeno[1,2,3-cd]pyrene - DL	340	U D	3620	3770	D	ug/Kg	☼	104	30 - 136	5	30
Isophorone - DL	200	U D	3620	1930	D	ug/Kg	☼	53	48 - 100	4	30
Naphthalene - DL	190	U D	3620	2360	D	ug/Kg	☼	65	54 - 98	2	30
Nitrobenzene - DL	220	U D	3620	2330	D	ug/Kg	☼	64	51 - 106	3	30
N-Nitrosodi-n-propylamine - DL	220	U D	3620	2310	D	ug/Kg	☼	64	47 - 104	7	30
Pentachlorophenol - DL	1800	U D	3620	2550	J D	ug/Kg	☼	70	23 - 116	10	30
Phenanthrene - DL	230	U D	3620	2820	D	ug/Kg	☼	78	53 - 106	1	30
Phenol - DL	210	U D	3620	2450	D	ug/Kg	☼	68	41 - 100	6	30
Pyrene - DL	400	U D	3620	2780	D	ug/Kg	☼	77	39 - 130	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*79*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*71*		*59 - 110*
2-Fluorophenol (Surr) - DL	*69*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*62*		*44 - 120*
Phenol-d5 (Surr) - DL	*68*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*77*		*59 - 98*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32227-11 - DL	B3L310	60	68	71	52	69	78
160-32227-11 MS - DL	B3L310	77	74	71	57	67	80
160-32227-11 MSD - DL	B3L310	79	71	69	62	68	77
160-32227-12	B3L322	79	83	87	70	80	83
160-32227-13 - DL	B3L301	72	77	77	62	70	91
160-32227-14 - DL	B3L325	68	72	72	58	73	88
160-32227-15	B3L319	76	74	79	65	72	77
160-32227-16 - DL	B3L307	67	74	77	62	68	87
160-32227-17 - DL	B3L2Y2	69	76	76	63	72	83
160-32227-18 - DL	B3L2Y5	64	69	65	51	60	67
160-32227-19 - DL	B3L328	82	77	72	59	72	82
160-32227-20 - DL	B3L340	75	80	77	66	74	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405791/2-A	Lab Control Sample	78	78	79	73	72	84
MB 160-405791/1-A	Method Blank	69	75	75	61	71	81

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32227-1	B3L324	94	77
160-32227-1 MS	B3L324	87	81
160-32227-1 MSD	B3L324	84	82
160-32227-2	B3L318	100	82
160-32227-3	B3L2Y4	75	79
160-32227-4	B3L306	101	82

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466527**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1832655											
QC1204182190 LCS											
Diesel Range Organics	66700				72800	UG/KG		109	(70%-130%)	LXA1	12/20/18 01:55
**o-Terphenyl	667				687	UG/KG		103	(50%-150%)		
QC1204182189 MB											
Diesel Range Organics				U	2170	UG/KG					12/20/18 01:16
**o-Terphenyl	667				576	UG/KG		86	(50%-150%)		
QC1204182193 466527013 MS											
Diesel Range Organics	70500	U	2290		56200	UG/KG		80	(70%-130%)		12/21/18 00:19
**o-Terphenyl	705		657		623	UG/KG		88	(50%-150%)		
QC1204182194 466527013 MSD											
Diesel Range Organics	70400	U	2290		50300	UG/KG	11	71	(0%-20%)		12/21/18 00:58
**o-Terphenyl	704		657		530	UG/KG		75	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466527

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204182189	MB for batch 1832655	86
1204182190	LCS for batch 1832655	103
466527008	B3MN21	73
466527009	B3MN23	64
466527010	B3MN26	89
466527011	B3MN27	69
466527012	B3MN32	93
466527013	B3MN33	93
1204182193	B3MN33MS	88
1204182194	B3MN33MSD	75
466527014	B3MN34	74

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 27, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466527**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics											
Batch 1833120											
QC1204183344 LCS											
Gasoline Range Organics	500				388	UG/KG		78	(70%-130%)	RXY1	12/26/18 12:28
**Bromofluorobenzene	50.0				47.7	UG/KG		95	(50%-150%)		
QC1204183343 MB											
Gasoline Range Organics				U	16.7	UG/KG					12/26/18 12:56
**Bromofluorobenzene	50.0				45.6	UG/KG		91	(50%-150%)		
QC1204183345 466527008 PS											
Gasoline Range Organics	500	TUX	0.00	TX	319	ug/L		64*	(70%-130%)		12/26/18 19:06
**Bromofluorobenzene	50.0		34.6		31.0	ug/L		62	(50%-150%)		
QC1204183346 466527008 PSD											
Gasoline Range Organics	500	TUX	0.00	TX	287	ug/L	11	57*	(0%-20%)		12/26/18 19:34
**Bromofluorobenzene	50.0		34.6		31.8	ug/L		64	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466527

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204183344	LCS for batch 1833119	95
1204183343	MB for batch 1833119	91
466527008	B3MN21	69
466527009	B3MN23	56
466527010	B3MN26	45 *
466527011	B3MN27	84
466527012	B3MN32	76
466527013	B3MN33	95
466527014	B3MN34	75
1204183345	B3MN21PS	62
1204183346	B3MN21PSD	64

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466597**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1833074											
QC1204183229 LCS											
Diesel Range Organics	66700				58100	UG/KG		87	(70%-130%)	LXA1	12/21/18 01:51
**o-Terphenyl	667				583	UG/KG		87	(50%-150%)		
QC1204183228 MB											
Diesel Range Organics				U	2170	UG/KG					12/21/18 01:11
**o-Terphenyl	667				497	UG/KG		75	(50%-150%)		
QC1204183230 466597020 MS											
Diesel Range Organics	77700	U	2520		60900	UG/KG		78	(70%-130%)		12/21/18 10:32
**o-Terphenyl	777		627		578	UG/KG		74	(50%-150%)		
QC1204183231 466597020 MSD											
Diesel Range Organics	90100	U	2520		77200	UG/KG	24*	86	(0%-20%)		12/21/18 11:12
**o-Terphenyl	901		627		782	UG/KG		87	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466597

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204183228	MB for batch 1833074	75
1204183229	LCS for batch 1833074	87
466597011	B3MN20	70
466597012	B3MN25	78
466597013	B3MN19	63
466597014	B3MN30	72
466597015	B3MN31	65
466597016	B3MN28	68
466597017	B3MN29	78
466597018	B3MN35	85
466597019	B3MN22	76
466597020	B3MN24	81
1204183230	B3MN24MS	74
1204183231	B3MN24MSD	87

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 28, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466597**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1833122										
QC1204183348 LCS										
Gasoline Range Organics	500			388	UG/KG		78	(70%-130%)	RXY1	12/26/18 12:28
**Bromofluorobenzene	50.0			47.7	UG/KG		95	(50%-150%)		
QC1204187642 LCS										
Gasoline Range Organics	500			375	UG/KG		75	(70%-130%)		12/27/18 12:40
**Bromofluorobenzene	50.0			45.2	UG/KG		90	(50%-150%)		
QC1204183347 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/26/18 12:56
**Bromofluorobenzene	50.0			45.6	UG/KG		91	(50%-150%)		
QC1204187641 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/27/18 13:08
**Bromofluorobenzene	50.0			48.1	UG/KG		96	(50%-150%)		
QC1204183350 466597020 PS										
Gasoline Range Organics	500 TUX	0.00	TX	284	ug/L		57*	(70%-130%)		12/27/18 16:24
**Bromofluorobenzene	50.0	29.3		26.6	ug/L		53	(50%-150%)		
QC1204183352 466597020 PSD										
Gasoline Range Organics	500 TUX	0.00	TX	224	ug/L	24*	45*	(0%-20%)		12/27/18 16:53
**Bromofluorobenzene	50.0	29.3		29.4	ug/L		59	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466597

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204183348	LCS for batch 1833122	95
1204183347	MB for batch 1833122	91
466597012	B3MN25	51
466597013	B3MN19	56
466597014	B3MN30	63
1204187642	LCS for batch 1833122	90
1204187641	MB for batch 1833122	96
466597015	B3MN31	52
466597016	B3MN28	58
466597017	B3MN29	77
466597018	B3MN35	65
466597019	B3MN22	65
466597020	B3MN24	59
1204183350	B3MN24PS	53
1204183352	B3MN24PSD	59
466597011	B3MN20	50

Surrogate	Acceptance Limits
BFB = Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL32193-1. SL32227-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32193-1 and SL32227-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L330	12/06/18	Soil	C	8081A
B3L333	12/06/18	Soil	C	8081A
B3L303	12/06/18	Soil	C	8081A
B3L336	12/06/18	Soil	C	8081A
B3L315	12/06/18	Soil	C	8081A
B3L2Y7	12/06/18	Soil	C	8081A
B3L312	12/06/18	Soil	C	8081A
B3L324	12/07/18	Soil	C	8081A
B3L318	12/07/18	Soil	C	8081A
B3L2Y4	12/07/18	Soil	C	8081A
B3L306	12/07/18	Soil	C	8081A
B3L327	12/07/18	Soil	C	8081A
B3L339	12/07/18	Soil	C	8081A
B3L321	12/07/18	Soil	C	8081A
B3L300	12/07/18	Soil	C	8081A
B3L2Y1	12/07/18	Soil	C	8081A
B3L309	12/07/18	Soil	C	8081A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL32193-1, the MS and MSD recoveries for endosulfan I were below the lower acceptance limit but ≥10%. All associated sample results were non-detects and should be

qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32227-1, the MS and/or MSD recoveries for endosulfan I, endosulfan II, endosulfan sulfate, endrin aldehyde and methoxychlor were below the lower acceptance limit but ≥10%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL32193-1, the LCS recovery for endosulfan I was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32227-1, the LCS recovery for endosulfan I was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

It should be mentioned that LCS analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,4′-DDD, 4,4′-DDE, 4,4′-DDT and dieldrin were met. CRDLs for other pesticides were not provided in the SAP.

- **Completeness**

SDG SL32193-1 and SL32227-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to matrix spike and LCS infractions. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDGs: SL32193-1, SL32227-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
endosulfan I	UJ	B3L330, B3L333, B3L303, B3L336, B3L315, B3L2Y7, B3L312, B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309	Low matrix spike recoveries and low LCS recoveries
endosulfan II, endosulfan sulfate, endrin aldehyde, methoxychlor	UJ	B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309	Low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/25/19	
			SDG: SL32193-1, SL32227-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32193-1: B3L330, B3L333, B3L303, B3L336, B3L315, B3L2Y7, B3L312					
SL32227-1: B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A
DDT and endrin breakdowns acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL32193-1: endosulfan I 68%/69%

SL32227-1: endosulfan I 62%/63%, endosulfan II 61%/63%, endosulfan sulfate 69% (MS), endrin aldehyde 68%/69%, methoxyclor 69%(MS)

LCS

SL32193-1: endosulfan I 69%

SL32227-1: endosulfan I 68%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32193-8 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3L2Y8
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	51	U	3700	3030		ug/Kg	☼	82	45 - 109	2	30
Hexachlorobenzene	47	U	3700	3210		ug/Kg	☼	87	48 - 113	7	30
Hexachlorobutadiene	44	U	3700	2950		ug/Kg	☼	80	48 - 109	4	30
Hexachlorocyclopentadiene	370	U	3700	2450		ug/Kg	☼	66	21 - 144	3	30
Hexachloroethane	38	U	3700	2510		ug/Kg	☼	68	44 - 102	8	30
Indeno[1,2,3-cd]pyrene	70	U	3700	2380		ug/Kg	☼	64	30 - 136	4	30
Isophorone	42	U	3700	2370		ug/Kg	☼	64	48 - 100	1	30
Naphthalene	39	U	3700	2780		ug/Kg	☼	75	54 - 98	4	30
Nitrobenzene	45	U	3700	2670		ug/Kg	☼	72	51 - 106	2	30
N-Nitrosodi-n-propylamine	45	U	3700	2800		ug/Kg	☼	76	47 - 104	4	30
Pentachlorophenol	370	U	3700	2740		ug/Kg	☼	74	23 - 116	2	30
Phenanthrene	47	U	3700	3060		ug/Kg	☼	83	53 - 106	1	30
Phenol	42	U	3700	2750		ug/Kg	☼	74	41 - 100	5	30
Pyrene	81	U	3700	3130		ug/Kg	☼	85	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*83*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*72*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*88*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Toxaphene	23	U	67	23	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*	*12/20/18 11:36*	*12/31/18 20:13*	*1*
Tetrachloro-m-xylene	*88*		*71 - 111*	*12/20/18 11:36*	*12/31/18 20:13*	*1*

Lab Sample ID: LCS 160-406865/2-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.3		ug/Kg		92	72 - 117
4,4'-DDE	16.7	14.2		ug/Kg		85	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.0		ug/Kg		84	70 - 102
alpha-BHC	16.7	14.7		ug/Kg		88	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	14.1		ug/Kg		85	68 - 102
delta-BHC	16.7	15.5		ug/Kg		93	72 - 117
Dieldrin	16.7	14.7		ug/Kg		88	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		69	34 - 96
Endosulfan II	16.7	13.4		ug/Kg		80	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	14.3		ug/Kg		86	76 - 116
Endrin aldehyde	16.7	14.6		ug/Kg		87	54 - 97
Endrin ketone	16.7	15.3		ug/Kg		92	71 - 113
gamma-BHC (Lindane)	16.7	14.3		ug/Kg		86	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.3		ug/Kg		86	72 - 107
Methoxychlor	16.7	14.9		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.3		ug/Kg		86	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.2	14.9		ug/Kg	☼	86	60 - 121
4,4'-DDE	3.2		17.2	16.6		ug/Kg	☼	78	63 - 111
4,4'-DDT	1.5	J	17.2	15.7		ug/Kg	☼	83	59 - 122
Aldrin	0.60	U	17.2	12.8		ug/Kg	☼	74	57 - 110
alpha-BHC	0.40	U	17.2	13.3		ug/Kg	☼	78	62 - 117

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
alpha-Chlordane	0.98	U	17.2	14.1		ug/Kg	☼	82	58 - 114
beta-BHC	0.48	U	17.2	13.3		ug/Kg	☼	77	61 - 108
delta-BHC	0.36	U	17.2	15.1		ug/Kg	☼	88	64 - 121
Dieldrin	0.22	U	17.2	14.6		ug/Kg	☼	85	57 - 114
Endosulfan I	0.59	U	17.2	11.8		ug/Kg	☼	68	31 - 89
Endosulfan II	0.30	U	17.2	13.5		ug/Kg	☼	79	40 - 93
Endosulfan sulfate	0.35	U	17.2	13.8		ug/Kg	☼	80	56 - 112
Endrin	0.35	U	17.2	14.3		ug/Kg	☼	83	64 - 125
Endrin aldehyde	0.41	U	17.2	13.9		ug/Kg	☼	80	45 - 101
Endrin ketone	0.44	U	17.2	13.9		ug/Kg	☼	81	59 - 115
gamma-BHC (Lindane)	0.50	U	17.2	13.1		ug/Kg	☼	76	61 - 113
Heptachlor	0.30	U	17.2	12.3		ug/Kg	☼	72	33 - 150
Heptachlor epoxide	0.50	U	17.2	14.1		ug/Kg	☼	82	60 - 114
Methoxychlor	0.86	U	17.2	13.2		ug/Kg	☼	76	58 - 130
trans-Chlordane	0.40	U	17.2	14.5		ug/Kg	☼	84	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*91*		*72 - 115*
Tetrachloro-m-xylene	*71*		*71 - 111*

Lab Sample ID: 160-32193-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.4	14.5		ug/Kg	☼	83	60 - 121	2	30
4,4'-DDE	3.2		17.4	16.4		ug/Kg	☼	76	63 - 111	2	30
4,4'-DDT	1.5	J	17.4	15.2		ug/Kg	☼	79	59 - 122	3	30
Aldrin	0.60	U	17.4	13.4		ug/Kg	☼	77	57 - 110	4	30
alpha-BHC	0.40	U	17.4	14.3		ug/Kg	☼	82	62 - 117	7	30
alpha-Chlordane	0.98	U	17.4	14.2		ug/Kg	☼	81	58 - 114	1	30
beta-BHC	0.48	U	17.4	13.8		ug/Kg	☼	79	61 - 108	4	30
delta-BHC	0.36	U	17.4	15.5		ug/Kg	☼	89	64 - 121	2	30
Dieldrin	0.22	U	17.4	14.8		ug/Kg	☼	85	57 - 114	1	30
Endosulfan I	0.59	U	17.4	12.0		ug/Kg	☼	69	31 - 89	2	30
Endosulfan II	0.30	U	17.4	13.8		ug/Kg	☼	79	40 - 93	2	30
Endosulfan sulfate	0.35	U	17.4	13.7		ug/Kg	☼	79	56 - 112	0	30
Endrin	0.35	U	17.4	14.4		ug/Kg	☼	83	64 - 125	1	30
Endrin aldehyde	0.41	U	17.4	14.2		ug/Kg	☼	81	45 - 101	2	30
Endrin ketone	0.44	U	17.4	14.1		ug/Kg	☼	81	59 - 115	1	30
gamma-BHC (Lindane)	0.50	U	17.4	14.0		ug/Kg	☼	80	61 - 113	6	30
Heptachlor	0.30	U	17.4	12.8		ug/Kg	☼	74	33 - 150	4	30
Heptachlor epoxide	0.50	U	17.4	14.5		ug/Kg	☼	83	60 - 114	3	30
Methoxychlor	0.86	U	17.4	12.8		ug/Kg	☼	73	58 - 130	3	30
trans-Chlordane	0.40	U	17.4	14.8		ug/Kg	☼	85	62 - 114	2	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32193-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	77		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.9	U	173	154		ug/Kg	☼	89	23 - 140
Aroclor 1260	10	U	173	158		ug/Kg	☼	91	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32193-1	B3L330	105	73
160-32193-1 MS	B3L330	91	71
160-32193-1 MSD	B3L330	92	77
160-32193-3	B3L303	98	85
160-32193-4	B3L336	103	82
160-32193-5	B3L315	103	85
160-32193-6	B3L2Y7	93	79
160-32193-7	B3L312	89	78

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32193-2	B3L333	99	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32193-1	B3L330	85
160-32193-1 MS	B3L330	88
160-32193-1 MSD	B3L330	93
160-32193-2	B3L333	92
160-32193-3	B3L303	75
160-32193-4	B3L336	77
160-32193-5	B3L315	86
160-32193-6	B3L2Y7	85
160-32193-7	B3L312	85

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-405132/2-A	Lab Control Sample	93
MB 160-405132/1-A	Method Blank	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-405534/1-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405534

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
Toxaphene	23	U	67	23	ug/Kg		12/13/18 15:03	12/23/18 15:49	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/13/18 15:03	12/23/18 15:49	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*	*12/13/18 15:03*	*12/23/18 15:49*	*1*
Tetrachloro-m-xylene	*90*		*71 - 111*	*12/13/18 15:03*	*12/23/18 15:49*	*1*

Lab Sample ID: LCS 160-405534/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.3		ug/Kg		86	72 - 117
4,4'-DDE	16.7	14.9		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.4		ug/Kg		92	72 - 119
Aldrin	16.7	13.9		ug/Kg		83	70 - 102
alpha-BHC	16.7	14.4		ug/Kg		86	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	13.4		ug/Kg		81	68 - 102
delta-BHC	16.7	14.9		ug/Kg		89	72 - 117
Dieldrin	16.7	14.6		ug/Kg		87	72 - 108
Endosulfan I	16.7	11.4		ug/Kg		68	34 - 96
Endosulfan II	16.7	12.2		ug/Kg		73	46 - 96
Endosulfan sulfate	16.7	13.6		ug/Kg		81	68 - 108
Endrin	16.7	13.8		ug/Kg		83	76 - 116
Endrin aldehyde	16.7	13.6		ug/Kg		81	54 - 97
Endrin ketone	16.7	14.3		ug/Kg		86	71 - 113
gamma-BHC (Lindane)	16.7	13.9		ug/Kg		83	71 - 107
Heptachlor	16.7	13.4		ug/Kg		81	55 - 128

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-405534/2-A
Matrix: Solid
Analysis Batch: 407334

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	16.7	14.1		ug/Kg		84	72 - 107
Methoxychlor	16.7	14.4		ug/Kg		86	71 - 124
trans-Chlordane	16.7	14.5		ug/Kg		87	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*96*		*72 - 115*
Tetrachloro-m-xylene	*84*		*71 - 111*

Lab Sample ID: 160-32227-1 MS
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.38	U	18.1	12.6		ug/Kg	☼	70	60 - 121
4,4'-DDE	0.92	U	18.2	14.7		ug/Kg	☼	81	63 - 111
4,4'-DDT	0.69	U	18.1	14.2		ug/Kg	☼	78	59 - 122
Aldrin	0.63	U	18.1	13.8		ug/Kg	☼	76	57 - 110
alpha-BHC	0.43	U	18.1	14.7		ug/Kg	☼	81	62 - 117
alpha-Chlordane	1.0	U	18.1	14.1		ug/Kg	☼	78	58 - 114
beta-BHC	0.50	U	18.1	13.4		ug/Kg	☼	74	61 - 108
delta-BHC	0.37	U	18.1	15.0		ug/Kg	☼	82	64 - 121
Dieldrin	0.24	U	18.2	14.0		ug/Kg	☼	77	57 - 114
Endosulfan I	0.62	U	18.1	11.2		ug/Kg	☼	62	31 - 89
Endosulfan II	0.32	U	18.1	11.0		ug/Kg	☼	61	40 - 93
Endosulfan sulfate	0.37	U	18.1	12.4		ug/Kg	☼	69	56 - 112
Endrin	0.36	U	18.2	13.1		ug/Kg	☼	72	64 - 125
Endrin aldehyde	0.43	U	18.2	12.3		ug/Kg	☼	68	45 - 101
Endrin ketone	0.46	U	18.2	13.7		ug/Kg	☼	75	59 - 115
gamma-BHC (Lindane)	0.52	U	18.2	14.1		ug/Kg	☼	78	61 - 113
Heptachlor	0.31	U	18.1	13.5		ug/Kg	☼	74	33 - 150
Heptachlor epoxide	0.52	U	18.1	14.1		ug/Kg	☼	78	60 - 114
Methoxychlor	0.91	U	18.1	12.5		ug/Kg	☼	69	58 - 130
trans-Chlordane	0.42	U	18.1	14.4		ug/Kg	☼	79	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*72 - 115*
Tetrachloro-m-xylene	*81*		*71 - 111*

Lab Sample ID: 160-32227-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.38	U	18.2	13.1		ug/Kg	☼	72	60 - 121	4	30
4,4'-DDE	0.92	U	18.3	15.1		ug/Kg	☼	83	63 - 111	3	30
4,4'-DDT	0.69	U	18.2	14.5		ug/Kg	☼	79	59 - 122	2	30
Aldrin	0.63	U	18.2	14.1		ug/Kg	☼	77	57 - 110	2	30
alpha-BHC	0.43	U	18.2	14.8		ug/Kg	☼	81	62 - 117	1	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32227-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.0	U	18.2	14.2		ug/Kg	☼	78	58 - 114	1	30
beta-BHC	0.50	U	18.2	13.9		ug/Kg	☼	76	61 - 108	4	30
delta-BHC	0.37	U	18.2	15.7		ug/Kg	☼	86	64 - 121	5	30
Dieldrin	0.24	U	18.3	14.4		ug/Kg	☼	79	57 - 114	2	30
Endosulfan I	0.62	U	18.2	11.4		ug/Kg	☼	63	31 - 89	2	30
Endosulfan II	0.32	U	18.2	11.5		ug/Kg	☼	63	40 - 93	5	30
Endosulfan sulfate	0.37	U	18.2	12.8		ug/Kg	☼	70	56 - 112	3	30
Endrin	0.36	U	18.3	13.4		ug/Kg	☼	73	64 - 125	2	30
Endrin aldehyde	0.43	U	18.3	12.6		ug/Kg	☼	69	45 - 101	2	30
Endrin ketone	0.46	U	18.3	13.9		ug/Kg	☼	76	59 - 115	2	30
gamma-BHC (Lindane)	0.52	U	18.3	14.4		ug/Kg	☼	79	61 - 113	2	30
Heptachlor	0.31	U	18.2	13.6		ug/Kg	☼	74	33 - 150	0	30
Heptachlor epoxide	0.52	U	18.2	14.4		ug/Kg	☼	79	60 - 114	2	30
Methoxychlor	0.91	U	18.2	12.7		ug/Kg	☼	70	58 - 130	2	30
trans-Chlordane	0.42	U	18.2	14.6		ug/Kg	☼	80	62 - 114	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*82*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405736/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405736

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1248	11	U	33	11	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1254	13	U	33	13	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1260	10	U	33	10	ug/Kg		12/13/18 16:39	12/20/18 03:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*88*		*23 - 146*	*12/13/18 16:39*	*12/20/18 03:54*	*1*

Lab Sample ID: LCS 160-405736/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405736

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	155		ug/Kg		93	52 - 134
Aroclor 1260	167	147		ug/Kg		88	50 - 132

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32227-11 - DL	B3L310	60	68	71	52	69	78
160-32227-11 MS - DL	B3L310	77	74	71	57	67	80
160-32227-11 MSD - DL	B3L310	79	71	69	62	68	77
160-32227-12	B3L322	79	83	87	70	80	83
160-32227-13 - DL	B3L301	72	77	77	62	70	91
160-32227-14 - DL	B3L325	68	72	72	58	73	88
160-32227-15	B3L319	76	74	79	65	72	77
160-32227-16 - DL	B3L307	67	74	77	62	68	87
160-32227-17 - DL	B3L2Y2	69	76	76	63	72	83
160-32227-18 - DL	B3L2Y5	64	69	65	51	60	67
160-32227-19 - DL	B3L328	82	77	72	59	72	82
160-32227-20 - DL	B3L340	75	80	77	66	74	85

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405791/2-A	Lab Control Sample	78	78	79	73	72	84
MB 160-405791/1-A	Method Blank	69	75	75	61	71	81

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32227-1	B3L324	94	77
160-32227-1 MS	B3L324	87	81
160-32227-1 MSD	B3L324	84	82
160-32227-2	B3L318	100	82
160-32227-3	B3L2Y4	75	79
160-32227-4	B3L306	101	82

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32227-5	B3L327	90	80
160-32227-6	B3L339	76	77
160-32227-7	B3L321	89	76
160-32227-8	B3L300	86	81
160-32227-9	B3L2Y1	82	78
160-32227-10	B3L309	82	81

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
LCS 160-405534/2-A	Lab Control Sample	96	84
MB 160-405534/1-A	Method Blank	92	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	DCB1 (23-146)
160-32227-1	B3L324	79
160-32227-1 MS	B3L324	74
160-32227-1 MSD	B3L324	75
160-32227-2	B3L318	90
160-32227-3	B3L2Y4	74
160-32227-4	B3L306	73
160-32227-5	B3L327	84
160-32227-6	B3L339	82
160-32227-7	B3L321	80
160-32227-8	B3L300	84
160-32227-9	B3L2Y1	88
160-32227-10	B3L309	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL32193-1, SL32227-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32193-1 and SL32227-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L330	12/06/18	Soil	C	8081A
B3L333	12/06/18	Soil	C	8081A
B3L303	12/06/18	Soil	C	8081A
B3L336	12/06/18	Soil	C	8081A
B3L315	12/06/18	Soil	C	8081A
B3L2Y7	12/06/18	Soil	C	8081A
B3L312	12/06/18	Soil	C	8081A
B3L324	12/07/18	Soil	C	8081A
B3L318	12/07/18	Soil	C	8081A
B3L2Y4	12/07/18	Soil	C	8081A
B3L306	12/07/18	Soil	C	8081A
B3L327	12/07/18	Soil	C	8081A
B3L339	12/07/18	Soil	C	8081A
B3L321	12/07/18	Soil	C	8081A
B3L300	12/07/18	Soil	C	8081A
B3L2Y1	12/07/18	Soil	C	8081A
B3L309	12/07/18	Soil	C	8081A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for aroclor-1016, aroclor-1254 and aroclor-1260 were met. CRDLs for other PCBs were not provided in the SAP.

- **Completeness**

SDGs SL32193-1 and SL32227-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL32193-1, SL32227-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/25/19	
			SDG: SL32193-1, SL32227-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SL32193-1: B3L330, B3L333, B3L303, B3L336, B3L315, B3L2Y7, B3L312					
SL32227-1: B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A
DDT and endrin breakdowns acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs for aroclor 1016, aroclor 1254 and aroclor 1260 were met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32193-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	77		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.9	U	173	154		ug/Kg	☼	89	23 - 140
Aroclor 1260	10	U	173	158		ug/Kg	☼	91	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		23 - 146

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.9	U	172	154		ug/Kg	☼	89	23 - 140	0	30
Aroclor 1260	10	U	172	169		ug/Kg	☼	98	20 - 131	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*93*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406546/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1	U	8.5	2.1	mg/Kg		12/19/18 10:23	12/27/18 17:09	1
Lithium	1.3	U	4.2	1.3	mg/Kg		12/19/18 10:23	12/27/18 17:09	1

Lab Sample ID: LCS 160-406546/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.70	9.79		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-406546/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.74	D	mg/Kg		87.1	53.5 - 124.5

Lab Sample ID: 160-32193-1 MS — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.1	U N D	20.6	10.62	B N D	mg/Kg	☼	52	75 - 125
Lithium	7.4	B D	10.3	18.91	D	mg/Kg	☼	111	75 - 125

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.1	U N D	19.6	10.38	B D N	mg/Kg	☼	53	75 - 125	2	30
Lithium	7.4	B D	9.81	18.75	D	mg/Kg	☼	115	75 - 125	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)						
LCS 160-406865/2-A	Lab Control Sample	102	86						
MB 160-406865/1-A	Method Blank	98	88						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB1 (23-146)						
160-32193-1	B3L330	85						
160-32193-1 MS	B3L330	88						
160-32193-1 MSD	B3L330	93						
160-32193-2	B3L333	92						
160-32193-3	B3L303	75						
160-32193-4	B3L336	77						
160-32193-5	B3L315	86						
160-32193-6	B3L2Y7	85						
160-32193-7	B3L312	85						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	DCB1 (23-146)						
LCS 160-405132/2-A	Lab Control Sample	93						
MB 160-405132/1-A	Method Blank	89						

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32227-1 MSD
Matrix: Soil
Analysis Batch: 407334

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405534

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
alpha-Chlordane	1.0	U	18.2	14.2		ug/Kg	☼	78	58 - 114	1	30
beta-BHC	0.50	U	18.2	13.9		ug/Kg	☼	76	61 - 108	4	30
delta-BHC	0.37	U	18.2	15.7		ug/Kg	☼	86	64 - 121	5	30
Dieldrin	0.24	U	18.3	14.4		ug/Kg	☼	79	57 - 114	2	30
Endosulfan I	0.62	U	18.2	11.4		ug/Kg	☼	63	31 - 89	2	30
Endosulfan II	0.32	U	18.2	11.5		ug/Kg	☼	63	40 - 93	5	30
Endosulfan sulfate	0.37	U	18.2	12.8		ug/Kg	☼	70	56 - 112	3	30
Endrin	0.36	U	18.3	13.4		ug/Kg	☼	73	64 - 125	2	30
Endrin aldehyde	0.43	U	18.3	12.6		ug/Kg	☼	69	45 - 101	2	30
Endrin ketone	0.46	U	18.3	13.9		ug/Kg	☼	76	59 - 115	2	30
gamma-BHC (Lindane)	0.52	U	18.3	14.4		ug/Kg	☼	79	61 - 113	2	30
Heptachlor	0.31	U	18.2	13.6		ug/Kg	☼	74	33 - 150	0	30
Heptachlor epoxide	0.52	U	18.2	14.4		ug/Kg	☼	79	60 - 114	2	30
Methoxychlor	0.91	U	18.2	12.7		ug/Kg	☼	70	58 - 130	2	30
trans-Chlordane	0.42	U	18.2	14.6		ug/Kg	☼	80	62 - 114	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*
Tetrachloro-m-xylene	*82*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405736/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405736

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1248	11	U	33	11	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1254	13	U	33	13	ug/Kg		12/13/18 16:39	12/20/18 03:54	1
Aroclor 1260	10	U	33	10	ug/Kg		12/13/18 16:39	12/20/18 03:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*88*		*23 - 146*	*12/13/18 16:39*	*12/20/18 03:54*	*1*

Lab Sample ID: LCS 160-405736/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405736

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	155		ug/Kg		93	52 - 134
Aroclor 1260	167	147		ug/Kg		88	50 - 132

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-405736/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405736

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*75*		*23 - 146*

Lab Sample ID: 160-32227-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405736

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	11	U	182	160		ug/Kg	☼	88	23 - 140
Aroclor 1260	11	U	182	157		ug/Kg	☼	86	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*74*		*23 - 146*

Lab Sample ID: 160-32227-1 MSD
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 405736

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	11	U	182	162		ug/Kg	☼	89	23 - 140	2	30
Aroclor 1260	11	U	182	163		ug/Kg	☼	89	20 - 131	4	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*75*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406598/1-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406598

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.7	2.2	mg/Kg		12/19/18 10:26	12/27/18 19:22	1
Lithium	1.3	U	4.3	1.3	mg/Kg		12/19/18 10:26	12/27/18 19:22	1

Lab Sample ID: LCS 160-406598/2-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406598

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.46	9.34		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406598/3-A
Matrix: Solid
Analysis Batch: 407765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406598

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.82	D	mg/Kg		83.9	53.5 - 124.5

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-32227-5	B3L327	90	80
160-32227-6	B3L339	76	77
160-32227-7	B3L321	89	76
160-32227-8	B3L300	86	81
160-32227-9	B3L2Y1	82	78
160-32227-10	B3L309	82	81

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
LCS 160-405534/2-A	Lab Control Sample	96	84
MB 160-405534/1-A	Method Blank	92	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	DCB1 (23-146)
160-32227-1	B3L324	79
160-32227-1 MS	B3L324	74
160-32227-1 MSD	B3L324	75
160-32227-2	B3L318	90
160-32227-3	B3L2Y4	74
160-32227-4	B3L306	73
160-32227-5	B3L327	84
160-32227-6	B3L339	82
160-32227-7	B3L321	80
160-32227-8	B3L300	84
160-32227-9	B3L2Y1	88
160-32227-10	B3L309	84

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
LCS 160-405736/2-A	Lab Control Sample	75							
MB 160-405736/1-A	Method Blank	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL466527, GEL466597

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL466527 and GEL466597 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3L2Y6	12/06/18	Soil	C	8151A
B3L302	12/06/18	Soil	C	8081A
B3L311	12/06/18	Soil	C	8151A
B3L314	12/06/18	Soil	C	8081A
B3L329	12/06/18	Soil	C	8151A
B3L332	12/06/18	Soil	C	8081A
B3L335	12/06/18	Soil	C	8151A
B3L308	12/07/18	Soil	C	8081A
B3L2Y9	12/07/18	Soil	C	8151A
B3L338	12/07/18	Soil	C	8081A
B3L320	12/07/18	Soil	C	8151A
B3L317	12/07/18	Soil	C	8081A
B3L326	12/07/18	Soil	C	8151A
B3L323	12/07/18	Soil	C	8081A
B3L305	12/07/18	Soil	C	8151A
B3L2Y0	12/07/18	Soil	C	8081A
B3L2Y3	12/07/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for herbicides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL466527, the 2,4-dichlorophenylacetic acid (DCAA) surrogate recoveries for sample B3L311 on both columns were below the lower acceptance limit but ≥10%. All results for sample B3L311 were non-detects and should be qualified as estimates and flagged "UJ." The DCAA surrogate recoveries for samples B3L332MS and B3L332MSD were above the upper acceptance limit. Since the samples were QC samples, data should not be qualified as a result.

For SDG GEL466597, the DCAA surrogate recovery for sample B3L2Y3 on both columns and for sample B3L338 on the primary column were below the lower acceptance limit but ≥10%. All results for these samples were non-detects and should be qualified as estimates and flagged "UJ."

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG GEL466527
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for dalapon were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for MCPA, MCPP and 2,4-D were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

SDG GEL466597
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for dalapon, MCPA and MCPP were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for 2,4-DB and dichlorprop were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG GEL466527, the LCS recoveries for dalapon and dinoseb were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment all dalapon sample results should be qualified as estimates and flagged "UJ." All associated dinoseb sample results would be qualified as estimates and flagged UJ, but were further flagged "UR" due to very low matrix spike recoveries.

For SDG GEL466597, the LCS recoveries for dalapon, dinoseb and MCPP were below the lower acceptance limit. All associated sample results were non-detects and based on professional

judgment all dalapon and MCPP sample results should be qualified as estimates and flagged "UJ." All dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exceptions.

For SDG GEL466527, the RPDs for 2,4-D, dinoseb, MCPA and MCPP were above the upper acceptance limit. All associated sample results were non-detects, and all 2,4-D, MCPA and MCPP should be qualified as estimates and flagged "UJ." All dinoseb sample results would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike recoveries.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL466527 and GEL466597 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 90%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of all dinoseb sample results as unusable were due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of the sample results as estimates were due to low matrix spike recoveries, low surrogate recoveries, low LCS recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Herbicide Data Qualification Summary			
SDGs: GEL466527, GEL466597	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4,5-T, 2,4,5-TP, 2,4-DB, dicamba, dichlorprop	UJ	B3L311	Low surrogate recoveries
2,4-D, MCPA, MCPP	UJ	B3L311	Low surrogate recovery, poor MS/MSD precision
2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dicamba, dichlorprop	UJ	B3L338, B3L2Y3	Low surrogate recoveries
dinoseb	UR	B3L311	Low surrogate recoveries, very low matrix spike recoveries, low LCS recoveries and poor MS/MSD precision
dinoseb	UR	B3L338, B3L2Y3	Low surrogate recoveries, very low matrix spike recoveries and low LCS recoveries
dinoseb	UR	B3L308, B3L2Y9, B3L320, B3L317, B3L326, B3L323, B3L305, B3L2Y0	Very low matrix spike recoveries and low LCS recoveries
dinoseb	UR	B3L2Y6, B3L302, B3L314, B3L329, B3L332, B3L335	Very low matrix spike recoveries, low LCS recoveries and poor MS/MSD precision
dalapon	UJ	B3L311, B3L338, B3L2Y3	Low surrogate recoveries, low matrix spike recovery and low LCS recovery.
dalapon	UJ	B3L2Y6, B3L302, B3L314, B3L329, B3L332, B3L335, B3L308, B3L2Y9, B3L320, B3L317,	Low matrix spike recovery and low LCS recoveries

		B3L326, B3L323, B3L305, B3L2Y0	
MCPA	UJ	B3L308, B3L2Y9, B3L320, B3L317, B3L326, B3L323, B3L305, B3L2Y0	Low matrix spike recoveries.
MCPA	UJ	B3L338, B3L2Y3	Low surrogate recoveries and low matrix spike recoveries.
MCPP	UJ	B3L308, B3L2Y9, B3L320, B3L317, B3L326, B3L323, B3L305, B3L2Y0	Low matrix spike recovery and low LCS recovery.
MCPP	UJ	B3L338, B3L2Y3	Low surrogate recoveries, low matrix spike recoveries and low LCS recovery.
2,4-D, MCPA, MCPP	UJ	B3L2Y6, B3L302, B3L314, B3L329, B3L332, B3L335	Poor MS/MSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/25/19	
			SDG: GEL466527, GEL466597		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX: Soil					
GEL466527: B3L2Y6, B3L302, B3L311, B3L314, B3L329, B3L332, B3L335					
GEL466597: B3L308, B3L2Y9, B3L338, B3L320, B3L317, B3L326, B3L323, B3L305, B3L2Y0, B3L2Y3					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

GEL466527: B3L311 DCAA1/DCAA2 54%/56%; B3L332MS 693% (DCAA1), B3L332MSD 1304% (DCAA1)

GEL466597: B3L338 56% (DCAA1), B3L2Y3 37%/48% (DCAA1/DCAA2)

MS/MSD

GEL466527: dalapon 35%/38%, dinoseb 8%/13%, MCPA 193%/347, MCPP 179%;325%, 2,4-D 361% (MSD)

GEL466597: 2,4-DB 155%/137% dalapon 43%/46%, dichlorprop 138% (MS), dinoseb 5%/5%, MCPA 60%/47%, MCPP 63% (MSD)

LCS

GEL466527: dalapon 46%, dinoseb 55%

GEL466597: dalapon 49%, dinoseb 48%, MCPP 63%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	(Yes) No N/A
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL466527: RPDs 2,4-D 119%, dinoseb 46%, MCPA 56%, MCPP 58%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL were not provided.

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL466527

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204180685	MB for batch 1831924	79	98
1204180686	LCS for batch 1831924	94	90
466527001	B3L2Y6	85	97
466527002	B3L302	94	96
466527003	B3L311	54	56
466527004	B3L314	78	94
466527005	B3L329	88	92
466527006	B3L332	85	80
1204183906	B3L332MS	693 *	85
1204183907	B3L332MSD	1304 *	102
466527007	B3L335	100	90

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466527**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1831925										
QC1204180686 LCS										
2,4,5-T	39.9			34.8	ug/kg		87	(60%-139%)	LOF	12/20/18 16:55
2,4,5-TP	39.9			37.2	ug/kg		93	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			37.1	ug/kg		93	(51%-152%)		
Dalapon	399			183	ug/kg		46	(32%-110%)		
Dicamba	39.9			33.9	ug/kg		85	(53%-135%)		
Dichlorprop	39.9			32.3	ug/kg		81	(52%-136%)		
Dinoseb	39.9			22.0	ug/kg		55	(24%-104%)		
MCPA	3990			2880	ug/kg		72	(44%-142%)		
MCPP	3990			3010	ug/kg		75	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.7			89.7	ug/kg		90	(37%-149%)		
QC1204180685 MB										
2,4,5-T			U	1.65	ug/kg					12/20/18 16:35
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466527**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1831925												
2,4-D				U	1.65	ug/kg				LOF	12/20/18	16:35
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.5				78.6	ug/kg		79	(37%-149%)			
QC1204183906 466527006 MS												
2,4,5-T	41.7	U	1.75		30.7	ug/kg		74	(39%-144%)		12/21/18	02:58
2,4,5-TP	41.7	U	1.75		30.1	ug/kg		72	(40%-146%)			
2,4-D	41.7	TU	1.75		38.7	ug/kg		93	(40%-149%)			
2,4-DB	41.7	U	1.75		31.2	ug/kg		75	(29%-160%)			
Dalapon	417	U	36.8		144	ug/kg		35	(19%-132%)			
Dicamba	41.7	U	2.10		36.9	ug/kg		89	(46%-135%)			

QC Summary

Workorder: **466527**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831925											
Dichlorprop	41.7	U	2.38		31.6	ug/kg		76	(38%-145%)	LOF	12/21/18 02:58
Dinoseb	41.7	TU	1.75	JT	3.40	ug/kg		8*	(20%-118%)		
MCPA	4170	TU	242	PT	8190	ug/kg		196*	(29%-154%)		
MCPP	4170	TU	210	PT	7490	ug/kg		179*	(30%-135%)		
**2,4-Dichlorophenylacetic acid	104		83.8		89.0	ug/kg		85	(37%-149%)		
QC1204183907 466527006 MSD											
2,4,5-T	41.9	U	1.75		35.0	ug/kg	13	84	(0%-30%)		12/21/18 03:26
2,4,5-TP	41.9	U	1.75		32.6	ug/kg	8	78	(0%-30%)		
2,4-D	41.9	TU	1.75	EPT	151	ug/kg	119*	361*	(0%-30%)		
2,4-DB	41.9	U	1.75		31.1	ug/kg	0	74	(0%-30%)		
Dalapon	419	U	36.8		158	ug/kg	9	38	(0%-30%)		
Dicamba	41.9	U	2.10	P	42.1	ug/kg	13	101	(0%-30%)		
Dichlorprop	41.9	U	2.38	P	41.4	ug/kg	27	99	(0%-30%)		
Dinoseb	41.9	TU	1.75	PT	5.41	ug/kg	46*	13*	(0%-30%)		
MCPA	4190	TU	242	EPT	14500	ug/kg	56*	347*	(0%-30%)		
MCPP	4190	TU	210	EPT	13600	ug/kg	58*	325*	(0%-30%)		

QC Summary

Workorder: **466527**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1831925											
**2,4-Dichlorophenylacetic acid	105	83.8		107	ug/kg		102	(37%-149%)	LOF	12/21/18	03:26

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL466597

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204185499	MB for batch 1834127	67	92
1204185500	LCS for batch 1834127	92	89
466597001	B3L308	82	91
1204185501	B3L308MS	124	91
1204185502	B3L308MSD	124	88
466597002	B3L2Y9	82	97
466597003	B3L338	56	77
466597004	B3L320	83	97
466597005	B3L317	95	108
466597006	B3L326	78	96
466597007	B3L323	83	100
466597008	B3L305	84	100
466597009	B3L2Y0	86	102
466597010	B3L2Y3	37	48

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 26, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466597**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1834128											
QC1204185500 LCS											
2,4,5-T	39.9			37.0	ug/kg		93	(60%-139%)	LOF	12/24/18	19:18
2,4,5-TP	39.9			37.2	ug/kg		93	(62%-140%)			
2,4-D	39.9			36.0	ug/kg		90	(55%-140%)			
2,4-DB	39.9			38.9	ug/kg		98	(51%-152%)			
Dalapon	399			195	ug/kg		49	(32%-110%)			
Dicamba	39.9			36.0	ug/kg		90	(53%-135%)			
Dichlorprop	39.9			33.3	ug/kg		83	(52%-136%)			
Dinoseb	39.9			19.3	ug/kg		48	(24%-104%)			
MCPA	3990			2820	ug/kg		71	(44%-142%)			
MCPP	3990			2520	ug/kg		63	(39%-138%)			
**2,4-Dichlorophenylacetic acid	99.8			89.3	ug/kg		89	(37%-149%)			
QC1204185499 MB											
2,4,5-T			U	1.66	ug/kg					12/24/18	18:50
2,4,5-TP			U	1.66	ug/kg						

QC Summary

Workorder: **466597**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1834128										
2,4-D			U	1.66	ug/kg				LOF	12/24/18 18:50
2,4-DB			U	1.66	ug/kg					
Dalapon			U	35.0	ug/kg					
Dicamba			U	2.00	ug/kg					
Dichlorprop			U	2.26	ug/kg					
Dinoseb			U	1.66	ug/kg					
MCPA			U	230	ug/kg					
MCPP			U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	99.9			67.1	ug/kg		67	(37%-149%)		
QC1204185501 466597001 MS										
2,4,5-T	43.2	U	1.77	33.2	ug/kg		77	(39%-144%)		12/24/18 20:15
2,4,5-TP	43.2	U	1.77	40.7	ug/kg		94	(40%-146%)		
2,4-D	43.2	U	1.77	36.8	ug/kg		85	(40%-149%)		
2,4-DB	43.2	U	1.77	67.1	ug/kg		155	(29%-160%)		
Dalapon	432	U	37.4	185	ug/kg		43	(19%-132%)		
Dicamba	43.2	U	2.14	38.8	ug/kg		90	(46%-135%)		

QC Summary

Workorder: **466597**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1834128											
Dichlorprop	43.2	U	2.41		59.4	ug/kg		138	(38%-145%)	LOF	12/24/18 20:15
Dinoseb	43.2	TU	1.77	JT	2.36	ug/kg		5*	(20%-118%)		
MCPA	4320	U	246		2590	ug/kg		60	(29%-154%)		
MCPP	4320	U	214		3140	ug/kg		73	(30%-135%)		
**2,4-Dichlorophenylacetic acid	108		87.7		134	ug/kg		124	(37%-149%)		
QC1204185502 466597001 MSD											
2,4,5-T	43.3	U	1.77		33.0	ug/kg	0	76	(0%-30%)		12/24/18 20:43
2,4,5-TP	43.3	U	1.77		39.8	ug/kg	2	92	(0%-30%)		
2,4-D	43.3	U	1.77		35.2	ug/kg	4	81	(0%-30%)		
2,4-DB	43.3	U	1.77		59.2	ug/kg	12	137	(0%-30%)		
Dalapon	433	U	37.4		197	ug/kg	6	46	(0%-30%)		
Dicamba	43.3	U	2.14		38.2	ug/kg	2	88	(0%-30%)		
Dichlorprop	43.3	U	2.41		44.6	ug/kg	29	103	(0%-30%)		
Dinoseb	43.3	TU	1.77	JT	2.23	ug/kg	6	5*	(0%-30%)		
MCPA	4330	U	246		2050	ug/kg	23	47	(0%-30%)		
MCPP	4330	U	214	P	2730	ug/kg	14	63	(0%-30%)		

QC Summary

Workorder: **466597**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1834128											
**2,4-Dichlorophenylacetic acid	108	87.7		134	ug/kg		124	(37%-149%)	LOF	12/24/18	20:43

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Groups (SDGs) SL32193-1, SL32227-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL32193-1 and SL32227-1 prepared by TestAmerica Laboratory Inc.. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L330	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L333	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L303	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L336	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L315	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L2Y7	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L312	12/06/18	Soil	C	6010D, 6020B, 7471B
B3L324	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L318	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L2Y4	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L306	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L327	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L339	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L321	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L300	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L2Y1	12/07/18	Soil	C	6010D, 6020B, 7471B
B3L309	12/07/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation for all analytes requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike and the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG SL32193-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All B sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al were above the upper acceptance limit. The parent sample result was >4X the spike concentration; therefore data should not be qualified as a result.

For SDG SL32227-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30%. All sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for Al and Mn were above the upper acceptance limit. All associated sample results were detects, therefore, all Mn sample results should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of affected samples. The parent sample result for Al was >4X the spike concentration and data should not be qualified.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable with the following exceptions.

For SDG SL32193, As and Sr RPDs for samples B3L315/B3L336 were above the acceptance limit. The Mo result for sample B3L315 was < PQL and for sample B3L336 was >PQL.

For SDG SL32227, the Ni RPD for samples B3L324/B3L339 was above the acceptance limit.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs for As, Be, Cd, Cr, Pb, Zn and Hg were below the CRDLs. No other CRDLs were provided in the SAP.

- **Completeness**

SDGs SL32193-1 and SL32227-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to MS and MSD infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

SL740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Metals Data Qualification Summary			
SDG: SL32193-1, SL32227-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
B	UJ	B3L330, B3L333, B3L303, B3L336, B3L315, B3L2Y7, B3L312, B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309	Low matrix spike recoveries
Mn	J+	B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-015		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/25/19	
			SDG: SL32193-1, SL32227-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SL32193-1: B3L330, B3L333, B3L303, B3L336, B3L315, B3L2Y7, B3L312					
SL32227-1: B3L324, B3L318, B3L2Y4, B3L306, B3L327, B3L339, B3L321, B3L300, B3L2Y1, B3L309					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SL32193-1: B 52%/53%, Al 236%/324% (Al parent sample result >4X spike)

SL32227-1: B 45%/47%, Al 231%/354%, Mn 156% (MSD) (Al parent sample result >4X spike)

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG SL32193-1: B3L315/B3L336, As 54%, Sr 39%, Mo 135%(parent <PQL/dup >PQL)

SDG SL32227-1: B3L324/B3L339 Ni 50%

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No (N/A)
ICP serial dilution %D values acceptable?	Yes No (N/A)
ICP post digestion spike required?	Yes No (N/A)
ICP post digestion spike values acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.9	U	172	154		ug/Kg	☼	89	23 - 140	0	30
Aroclor 1260	10	U	172	169		ug/Kg	☼	98	20 - 131	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*93*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406546/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1	U	8.5	2.1	mg/Kg		12/19/18 10:23	12/27/18 17:09	1
Lithium	1.3	U	4.2	1.3	mg/Kg		12/19/18 10:23	12/27/18 17:09	1

Lab Sample ID: LCS 160-406546/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.70	9.79		mg/Kg		113	80 - 120

Lab Sample ID: LCSSRM 160-406546/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.74	D	mg/Kg		87.1	53.5 - 124.5

Lab Sample ID: 160-32193-1 MS — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.1	U N D	20.6	10.62	B N D	mg/Kg	☼	52	75 - 125
Lithium	7.4	B D	10.3	18.91	D	mg/Kg	☼	111	75 - 125

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406546**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.1	U N D	19.6	10.38	B D N	mg/Kg	☼	53	75 - 125	2	30
Lithium	7.4	B D	9.81	18.75	D	mg/Kg	☼	115	75 - 125	1	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32193-1
SDG: SL32193-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406542/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	U D	0.48	0.19	mg/Kg		12/19/18 10:14	01/03/19 12:06	2

Lab Sample ID: LCS 160-406542/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	48.5	46.69	D	mg/Kg		96	21 - 251

Lab Sample ID: 160-32193-1 MS — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.51	U D	45.9	43.07	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408906 — **Prep Batch: 406542**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.51	U D	47.4	45.37	D	mg/Kg	☼	96	75 - 125	5	30

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.7	U D	4.2	1.7	mg/Kg		12/19/18 10:21	12/28/18 18:48	2
Chromium	0.38	U D	0.85	0.38	mg/Kg		12/19/18 10:21	12/28/18 18:48	2

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Barium	0.42	U D	1.7	0.42	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Beryllium	0.034	U D	0.085	0.034	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Cadmium	0.020	U D	0.042	0.020	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Cobalt	0.063	U D	0.17	0.063	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Copper	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Lead	0.11	U D	0.25	0.11	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Manganese	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Molybdenum	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Nickel	0.17	U D	0.42	0.17	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Selenium	0.27	U D	0.42	0.27	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Silver	0.063	U D	0.17	0.063	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Strontium	0.20	U D	0.42	0.20	mg/Kg		12/19/18 10:21	12/31/18 16:39	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-406545/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.076	U D	0.17	0.076	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Uranium	0.034	U D	0.085	0.034	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Vanadium	0.34	U D	0.85	0.34	mg/Kg		12/19/18 10:21	12/31/18 16:39	2
Zinc	1.7	U D	4.2	1.7	mg/Kg		12/19/18 10:21	12/31/18 16:39	2

Lab Sample ID: LCS 160-406545/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	86.9	90.60	D	mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-406545/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406545**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7522	D	mg/Kg		90.0	50.2 - 149.5
Chromium	136	155.3	D	mg/Kg		114.2	70.0 - 130.1

Lab Sample ID: LCSSRM 160-406545/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	161	181.3	D	mg/Kg		112.6	70.2 - 129.8
Barium	260	284.3	D	mg/Kg		109.3	75.0 - 125.0
Beryllium	97.6	110.6	D	mg/Kg		113.3	75.0 - 125.0
Cadmium	211	230.6	D	mg/Kg		109.3	74.9 - 125.1
Cobalt	48.2	54.75	D	mg/Kg		113.6	74.9 - 124.9
Copper	166	191.2	D	mg/Kg		115.2	74.7 - 124.7
Lead	111	122.1	D	mg/Kg		110.0	71.0 - 128.8
Manganese	288	266.5	D	mg/Kg		92.5	57.3 - 101.0
Molybdenum	110	122.3	D	mg/Kg		111.2	70.5 - 129.1
Nickel	91.9	106.4	D	mg/Kg		115.8	70.0 - 129.5
Selenium	191	215.0	D	mg/Kg		112.6	68.6 - 131.9
Silver	43.3	47.87	D	mg/Kg		110.5	69.5 - 130.5
Strontium	107	118.3	D	mg/Kg		110.5	72.1 - 128.0

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406545/3-A
Matrix: Solid
Analysis Batch: 408460

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406545

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	110.7	D	mg/Kg		110.8	56.8 - 143.1
Vanadium	56.7	61.45	D	mg/Kg		108.4	56.8 - 143.4
Zinc	199	223.3	D	mg/Kg		112.2	69.8 - 130.2

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 408312

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406545

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5400	D	1030	7833	D X	mg/Kg	☼	236	75 - 125
Chromium	7.4	D	103	111.1	D	mg/Kg	☼	101	75 - 125

Lab Sample ID: 160-32193-1 MS
Matrix: Soil
Analysis Batch: 408460

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406545

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.6	D	103	99.80	D	mg/Kg	☼	94	75 - 125
Barium	68.1	D	103	168.8	D	mg/Kg	☼	98	75 - 125
Beryllium	0.28	D	10.3	11.10	D	mg/Kg	☼	105	75 - 125
Cadmium	0.13	D	103	102.3	D	mg/Kg	☼	99	75 - 125
Cobalt	7.3	D	103	105.5	D	mg/Kg	☼	95	75 - 125
Copper	13.0	D	103	111.9	D	mg/Kg	☼	96	75 - 125
Lead	9.2	D	103	110.1	D	mg/Kg	☼	98	75 - 125
Manganese	321	D N	103	454.4	D N	mg/Kg	☼	129	75 - 125
Molybdenum	0.29	B D	51.5	52.13	D	mg/Kg	☼	101	75 - 125
Nickel	9.0	D	103	115.5	D	mg/Kg	☼	103	75 - 125
Selenium	1.6	D	51.5	45.88	D	mg/Kg	☼	86	75 - 125
Silver	0.077	U D	20.6	20.49	D	mg/Kg	☼	99	75 - 125
Strontium	17.5	D	103	123.8	D	mg/Kg	☼	103	75 - 125
Tin	0.45	D	103	102.0	D	mg/Kg	☼	98	75 - 125
Uranium	0.49	D	103	105.2	D	mg/Kg	☼	102	75 - 125
Vanadium	52.6	D	103	141.8	D	mg/Kg	☼	87	75 - 125
Zinc	45.7	D	103	142.4	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-32193-1 MSD
Matrix: Soil
Analysis Batch: 408312

Client Sample ID: B3L330
Prep Type: Total/NA
Prep Batch: 406545

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5400	D	981	8572	D X	mg/Kg	☼	324	75 - 125	9	30
Chromium	7.4	D	98.1	106.8	D	mg/Kg	☼	101	75 - 125	4	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406545**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	2.6	D	98.1	97.69	D	mg/Kg	☼	97	75 - 125	2	30
Barium	68.1	D	98.0	173.1	D	mg/Kg	☼	107	75 - 125	3	30
Beryllium	0.28	D	9.81	10.72	D	mg/Kg	☼	106	75 - 125	3	30
Cadmium	0.13	D	98.1	98.83	D	mg/Kg	☼	101	75 - 125	3	30
Cobalt	7.3	D	98.1	101.5	D	mg/Kg	☼	96	75 - 125	4	30
Copper	13.0	D	98.1	108.8	D	mg/Kg	☼	98	75 - 125	3	30
Lead	9.2	D	98.1	108.2	D	mg/Kg	☼	101	75 - 125	2	30
Manganese	321	D N	98.1	442.6	D	mg/Kg	☼	124	75 - 125	3	30
Molybdenum	0.29	B D	49.0	50.29	D	mg/Kg	☼	102	75 - 125	4	30
Nickel	9.0	D	98.1	105.5	D	mg/Kg	☼	98	75 - 125	9	30
Selenium	1.6	D	49.0	45.29	D	mg/Kg	☼	89	75 - 125	1	30
Silver	0.077	U D	19.6	19.77	D	mg/Kg	☼	101	75 - 125	4	30
Strontium	17.5	D	98.1	122.1	D	mg/Kg	☼	107	75 - 125	1	30
Tin	0.45	D	98.1	98.83	D	mg/Kg	☼	100	75 - 125	3	30
Uranium	0.49	D	98.0	102.4	D	mg/Kg	☼	104	75 - 125	3	30
Vanadium	52.6	D	98.1	139.4	D	mg/Kg	☼	89	75 - 125	2	30
Zinc	45.7	D	98.1	140.1	D	mg/Kg	☼	96	75 - 125	2	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/20/18 09:19	12/21/18 09:54	1

Lab Sample ID: LCSSRM 160-406817/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.64	D	mg/Kg		92.5	59.7 - 139.1

Lab Sample ID: 160-32193-1 MS — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	1.00	1.04		mg/Kg	☼	104	80 - 120

Lab Sample ID: 160-32193-1 MSD — **Client Sample ID: B3L330**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	0.999	1.01		mg/Kg	☼	101	80 - 120	2	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 160-405736/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405736**

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	75		23 - 146

Lab Sample ID: 160-32227-1 MS — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405736**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	11	U	182	160		ug/Kg	☼	88	23 - 140
Aroclor 1260	11	U	182	157		ug/Kg	☼	86	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	74		23 - 146

Lab Sample ID: 160-32227-1 MSD — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405736**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	11	U	182	162		ug/Kg	☼	89	23 - 140	2	30
Aroclor 1260	11	U	182	163		ug/Kg	☼	89	20 - 131	4	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	75		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406598/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.7	2.2	mg/Kg		12/19/18 10:26	12/27/18 19:22	1
Lithium	1.3	U	4.3	1.3	mg/Kg		12/19/18 10:26	12/27/18 19:22	1

Lab Sample ID: LCS 160-406598/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.46	9.34		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406598/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.82	D	mg/Kg		83.9	53.5 - 124.5

Lab Sample ID: 160-32227-1 MS — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.2	U N D	21.5	9.78	B N D	mg/Kg	☼	45	75 - 125
Lithium	9.0	B D	10.8	20.12	D	mg/Kg	☼	103	75 - 125

Lab Sample ID: 160-32227-1 MSD — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.2	U N D	20.5	9.68	B D N	mg/Kg	☼	47	75 - 125	1	30
Lithium	9.0	B D	10.3	20.92	D	mg/Kg	☼	116	75 - 125	4	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406543/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.308	B D	0.48	0.19	mg/Kg		12/19/18 10:18	01/03/19 16:26	2

Lab Sample ID: LCS 160-406543/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	43.4	41.72	D	mg/Kg		96	21 - 251

Lab Sample ID: 160-32227-1 MS — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.52	B D C	53.3	50.91	D	mg/Kg	☼	95	75 - 125

Lab Sample ID: 160-32227-1 MSD — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.52	B D C	49.6	45.15	D	mg/Kg	☼	90	75 - 125	12	30

Lab Sample ID: MB 160-406597/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.7	U D	4.3	1.7	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Arsenic	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Barium	0.43	U D	1.7	0.43	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Beryllium	0.035	U D	0.087	0.035	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Cadmium	0.021	U D	0.043	0.021	mg/Kg		12/19/18 10:25	12/28/18 22:02	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-406597/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.39	U D	0.87	0.39	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Cobalt	0.065	U D	0.17	0.065	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Copper	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Lead	0.11	U D	0.26	0.11	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Manganese	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Molybdenum	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Nickel	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Silver	0.065	U D	0.17	0.065	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Strontium	0.21	U D	0.43	0.21	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Tin	0.078	U D	0.17	0.078	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Uranium	0.035	U D	0.087	0.035	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Vanadium	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Zinc	1.7	U D	4.3	1.7	mg/Kg		12/19/18 10:25	12/28/18 22:02	2

Lab Sample ID: MB 160-406597/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	0.28	U D	0.43	0.28	mg/Kg		12/19/18 10:25	12/31/18 19:53	2

Lab Sample ID: LCS 160-406597/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.6	88.89	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-406597/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7699	D	mg/Kg		92.1	50.2 - 149.5
Arsenic	161	192.1	D	mg/Kg		119.3	70.2 - 129.8
Barium	260	282.0	D	mg/Kg		108.5	75.0 - 125.0
Beryllium	97.6	104.8	D	mg/Kg		107.4	75.0 - 125.0
Cadmium	211	227.0	D	mg/Kg		107.6	74.9 - 125.1
Chromium	136	153.9	D	mg/Kg		113.2	70.0 - 130.1
Cobalt	48.2	56.69	D	mg/Kg		117.6	74.9 - 124.9
Copper	166	194.3	D	mg/Kg		117.0	74.7 - 124.7
Lead	111	128.3	D	mg/Kg		115.6	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406597/3-A
Matrix: Solid
Analysis Batch: 408312

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406597

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	255.6	D	mg/Kg		88.7	57.3 - 101.0
Molybdenum	110	126.6	D	mg/Kg		115.1	70.5 - 129.1
Nickel	91.9	108.5	D	mg/Kg		118.0	70.0 - 129.5
Silver	43.3	49.91	D	mg/Kg		115.3	69.5 - 130.5
Strontium	107	118.0	D	mg/Kg		110.3	72.1 - 128.0
Tin	99.9	116.7	D	mg/Kg		116.8	56.8 - 143.1
Vanadium	56.7	64.31	D	mg/Kg		113.4	56.8 - 143.4
Zinc	199	232.1	D	mg/Kg		116.6	69.8 - 130.2

Lab Sample ID: LCSSRM 160-406597/3-A
Matrix: Solid
Analysis Batch: 408460

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406597

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	191	214.9	D	mg/Kg		112.5	68.6 - 131.9

Lab Sample ID: 160-32227-1 MS
Matrix: Soil
Analysis Batch: 408312

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 406597

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	6460	D	1080	8956	D X	mg/Kg	☼	231	75 - 125
Arsenic	3.0	D	108	106.9	D	mg/Kg	☼	96	75 - 125
Barium	80.8	D	108	196.7	D	mg/Kg	☼	108	75 - 125
Beryllium	0.31	D	10.8	11.28	D	mg/Kg	☼	102	75 - 125
Cadmium	0.13	D	108	111.2	D	mg/Kg	☼	103	75 - 125
Chromium	9.8	D	108	105.5	D	mg/Kg	☼	89	75 - 125
Cobalt	8.7	D	108	112.0	D	mg/Kg	☼	96	75 - 125
Copper	13.8	D	108	115.5	D	mg/Kg	☼	94	75 - 125
Lead	7.7	D	108	120.0	D	mg/Kg	☼	104	75 - 125
Manganese	353	D N	108	466.9	D	mg/Kg	☼	106	75 - 125
Molybdenum	0.38	B D	53.9	56.99	D	mg/Kg	☼	105	75 - 125
Nickel	11.4	D	108	114.9	D	mg/Kg	☼	96	75 - 125
Silver	0.078	U D	21.5	22.30	D	mg/Kg	☼	104	75 - 125
Strontium	30.4	D	108	144.3	D	mg/Kg	☼	106	75 - 125
Tin	0.47	D	108	109.7	D	mg/Kg	☼	101	75 - 125
Uranium	0.56	D	108	118.0	D	mg/Kg	☼	109	75 - 125
Vanadium	54.6	D	108	151.4	D	mg/Kg	☼	90	75 - 125
Zinc	53.2	D	108	153.8	D	mg/Kg	☼	93	75 - 125

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32227-1 MS — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	1.7	D	53.9	48.70	D	mg/Kg	☼	87	75 - 125

Lab Sample ID: 160-32227-1 MSD — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	6460	D	1030	10100	D X	mg/Kg	☼	354	75 - 125	12	30
Arsenic	3.0	D	103	112.3	D	mg/Kg	☼	106	75 - 125	5	30
Barium	80.8	D	103	191.6	D	mg/Kg	☼	108	75 - 125	3	30
Beryllium	0.31	D	10.3	10.82	D	mg/Kg	☼	102	75 - 125	4	30
Cadmium	0.13	D	103	103.7	D	mg/Kg	☼	101	75 - 125	7	30
Chromium	9.8	D	103	110.1	D	mg/Kg	☼	98	75 - 125	4	30
Cobalt	8.7	D	103	117.7	D	mg/Kg	☼	106	75 - 125	5	30
Copper	13.8	D	103	120.7	D	mg/Kg	☼	104	75 - 125	4	30
Lead	7.7	D	103	112.1	D	mg/Kg	☼	102	75 - 125	7	30
Manganese	353	D N	103	513.2	D N	mg/Kg	☼	156	75 - 125	9	30
Molybdenum	0.38	B D	51.4	53.71	D	mg/Kg	☼	104	75 - 125	6	30
Nickel	11.4	D	103	120.3	D	mg/Kg	☼	106	75 - 125	5	30
Silver	0.078	U D	20.5	20.86	D	mg/Kg	☼	102	75 - 125	7	30
Strontium	30.4	D	103	142.2	D	mg/Kg	☼	109	75 - 125	1	30
Tin	0.47	D	103	102.6	D	mg/Kg	☼	99	75 - 125	7	30
Uranium	0.56	D	103	110.2	D	mg/Kg	☼	107	75 - 125	7	30
Vanadium	54.6	D	103	160.6	D	mg/Kg	☼	103	75 - 125	6	30
Zinc	53.2	D	103	164.7	D	mg/Kg	☼	108	75 - 125	7	30

Lab Sample ID: 160-32227-1 MSD — **Client Sample ID: B3L324**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	1.7	D	51.4	48.16	D	mg/Kg	☼	90	75 - 125	1	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/20/18 10:46	12/21/18 10:54	1

Lab Sample ID: LCSSRM 160-406833/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	11.06	D	mg/Kg		96.2	59.7 - 139.1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-051

TestAmerica Job ID: 160-32227-1
SDG: SL32227-1

Lab Sample ID: 160-32227-1 MS
Matrix: Soil
Analysis Batch: 407085

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 406833

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.018	B	1.06	1.13		mg/Kg	☼	105	80 - 120		

Lab Sample ID: 160-32227-1 MSD
Matrix: Soil
Analysis Batch: 407085

Client Sample ID: B3L324
Prep Type: Total/NA
Prep Batch: 406833

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.018	B	1.05	1.15		mg/Kg	☼	108	80 - 120	2	30

Date: 25 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8931-1, RL8944-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8931-1 and RL8944-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3L2X3	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2X4	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W7	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W1	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W3	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W6	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2X2	12/06/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W9	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2X0	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2X5	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W8	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W2	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W0	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2V9	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W5	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2W4	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241
B3L2X1	12/07/18	Soil	C	Co-60, Iso-U, Iso-Pu, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDC, the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided.

- **Completeness**

SDGs RL8931-1 and RL8944-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8931-1, RL8944-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	(C)	D	E

Project: RTL	Data Package: VSR19-015
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/25/19
	SDG: RL8931-1, RL8944-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241		

Samples/Matrix Soil

RL8931-1, B3L2X3, B3L2X4, B3L2W7, B3L2W1, B3L2W3, B3L2W6, B3L2X2

RL8944-1: B3L2W9, B3L2X0, B3L2X5, B3L2W8, B3L2W2, B3L2W0, B3L2V9, B3L2W5, B3L2W4, B3L2X1

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No N/A
Calibration check acceptable?	Yes No N/A
Calibration check standards traceable?	Yes No N/A
Calibration check standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No N/A
Background counts acceptable?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☒ N/A
Chemical carrier added?	Yes No (N/A)
Chemical recovery acceptable?	Yes No (N/A)
Chemical carrier traceable? (Levels D, E)	Yes No (N/A)
Chemical carrier expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	(Yes) No N/A
Tracer recovery acceptable?	(Yes) No N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No (N/A)
Spike recoveries acceptable?	Yes No (N/A)
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split sample(s) analyzed?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	Yes No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	Yes No N/A
Results supported in raw data?(Levels D, E)	Yes No N/A
Results acceptable? (Levels D, E)	Yes No N/A
MDC's meet required reporting limits?	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8931-1	B3L2X3	95.6
300-8931-1 DU	B3L2X3	98.2
300-8931-2	B3L2X4	91.7
300-8931-3	B3L2W7	101
300-8931-4	B3L2W1	95.7
300-8931-5	B3L2W3	74.4
300-8931-6	B3L2W6	99.5
300-8931-7	B3L2X2	105
LCS 300-16806/2-A	Lab Control Sample	104
MB 300-16806/1-A	Method Blank	99.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8931-1	B3L2X3	80.3
300-8931-1 DU	B3L2X3	85.3
300-8931-2	B3L2X4	98.5
300-8931-3	B3L2W7	91.4
300-8931-4	B3L2W1	81.2
300-8931-5	B3L2W3	61.8
300-8931-6	B3L2W6	79.2
300-8931-7	B3L2X2	42.9
LCS 300-16820/2-A	Lab Control Sample	89.5
MB 300-16820/1-A	Method Blank	86.3

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8931-1	B3L2X3	95.6
300-8931-1 DU	B3L2X3	107
300-8931-2	B3L2X4	91.7
300-8931-3	B3L2W7	101
300-8931-4	B3L2W1	95.7
300-8931-5	B3L2W3	74.4
300-8931-6	B3L2W6	99.5
300-8931-7	B3L2X2	105
LCS 300-16816/2-A	Lab Control Sample	104
MB 300-16816/1-A	Method Blank	99.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8931-1
SDG: RL8931-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16795/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0510	U		0.0286	0.370	0.0517	pCi/g	12/18/18 16:52	12/24/18 13:06	1

Lab Sample ID: LCS 300-16795/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.315		0.183	0.370	0.105	pCi/g	88	80 - 120

Lab Sample ID: 300-8931-1 DU — **Client Sample ID: B3L2X3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16957 — **Prep Batch: 16795**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	0.0296	U	-0.0268	U y	0.0900	0.370	0.0641	pCi/g	3958	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16820/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16967 — **Prep Batch: 16820**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	0.00889	U	0.0263	0.0264	1.00	0.0641	pCi/g	12/19/18 11:34	12/26/18 08:18	1
U-233/234	0.0340	U	0.0454	0.0457	1.00	0.0670	pCi/g	12/19/18 11:34	12/26/18 08:18	1
U-235/236	-0.000524	U	0.0262	0.0262	1.00	0.0480	pCi/g	12/19/18 11:34	12/26/18 08:18	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.3*		*30 - 105*	*12/19/18 11:34*	*12/26/18 08:18*	*1*

Lab Sample ID: LCS 300-16820/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16967 — **Prep Batch: 16820**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.13	3.144		0.625	1.00	0.0680	pCi/g	100	80 - 120
U-233/234	2.99	2.997		0.601	1.00	0.0583	pCi/g	100	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*89.5*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8931-1 DU
Matrix: Solid
Analysis Batch: 16967

Client Sample ID: B3L2X3
Prep Type: Total/NA
Prep Batch: 16820

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.104	U		0.0501	U y	0.0517	1.00	0.0504	pCi/g			70	30
U-233/234	0.0716	U		0.110	y	0.0786	1.00	0.0654	pCi/g			42	30
U-235/236	0.0123	U		-0.000511	U y	0.0256	1.00	0.0469	pCi/g			217	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*85.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16806/1-A
Matrix: Solid
Analysis Batch: 17009

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16806

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.0142	U	0.0338	0.0339	1.00	0.0732	pCi/g	12/19/18 09:03	12/27/18 12:02	1
Pu-239/240	-0.00405	U	0.0339	0.0339	1.00	0.0783	pCi/g	12/19/18 09:03	12/27/18 12:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*99.5*		*30 - 105*	*12/19/18 09:03*	*12/27/18 12:02*	*1*

Lab Sample ID: LCS 300-16806/2-A
Matrix: Solid
Analysis Batch: 17009

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16806

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.89	4.054		0.827	1.00	0.0837	pCi/g	83	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*104*		*30 - 105*

Lab Sample ID: 300-8931-1 DU
Matrix: Solid
Analysis Batch: 17009

Client Sample ID: B3L2X3
Prep Type: Total/NA
Prep Batch: 16806

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0024	U		-0.000665	U y	0.0333	1.00	0.0610	pCi/g			112	30
Pu-239/240	-0.0032	U		-0.00199	U y	0.0333	1.00	0.0692	pCi/g			45	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*98.2*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16816/1-A
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16816

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.0411	U	0.0845	1.59	15.0	3.03	pCi/g	12/19/18 11:06	12/28/18 23:57	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*99.5*			*12/19/18 11:06*	*12/28/18 23:57*	*1*

Lab Sample ID: LCS 300-16816/2-A
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16816

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			235	213.7		14.3	15.0	3.05	pCi/g	91	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*104*		

Lab Sample ID: 300-8931-1 DU
Matrix: Solid
Analysis Batch: 17048

Client Sample ID: B3L2X3
Prep Type: Total/NA
Prep Batch: 16816

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.801	U		0.0987	U y	1.54	15.0	2.94	pCi/g			156	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*107*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8944-1	B3L2W9	102
300-8944-2	B3L2X0	92.8
300-8944-3	B3L2X5	86.5
300-8944-4	B3L2W8	79.8
300-8944-5	B3L2W2	90.6
300-8944-6	B3L2W0	75.4
300-8944-7	B3L2V9	77.9
300-8944-8	B3L2W5	83.4
300-8944-9	B3L2W4	60.2
300-8944-10	B3L2X1	92.3
LCS 300-16888/2-A	Lab Control Sample	86.8
MB 300-16888/1-A	Method Blank	45.9

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8944-1	B3L2W9	84.7
300-8944-1 DU	B3L2W9	82.8
300-8944-2	B3L2X0	83.9
300-8944-3	B3L2X5	88.5
300-8944-4	B3L2W8	101
300-8944-5	B3L2W2	96.4
300-8944-6	B3L2W0	72.1
300-8944-7	B3L2V9	95.9
300-8944-8	B3L2W5	79.5
300-8944-9	B3L2W4	86.5
300-8944-10	B3L2X1	86.8
LCS 300-16908/2-B	Lab Control Sample	91.2
MB 300-16908/1-A	Method Blank	77.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8944-1	B3L2W9	102
300-8944-2	B3L2X0	92.8
300-8944-3	B3L2X5	86.5
300-8944-4	B3L2W8	79.8
300-8944-5	B3L2W2	90.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-050

TestAmerica Job ID: 300-8944-1
SDG: RL8944-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8944-6	B3L2W0	75.4							
300-8944-7	B3L2V9	77.9							
300-8944-8	B3L2W5	83.4							
300-8944-9	B3L2W4	60.2							
300-8944-10	B3L2X1	92.3							
LCS 300-16902/2-A	Lab Control Sample	86.8							
MB 300-16902/1-A	Method Blank	45.9							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16832/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0237	U		0.0748	0.370	0.0558	pCi/g	12/19/18 14:26	12/26/18 10:23	1

Lab Sample ID: LCS 300-16832/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.566		0.199	0.370	0.117	pCi/g	98	80 - 120		

Lab Sample ID: 300-8944-1 DU — **Client Sample ID: B3L2W9**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16988 — **Prep Batch: 16832**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	0.0133	U		0.0591	U y	0.0299	0.370	0.0818	pCi/g			126	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16908/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17012 — **Prep Batch: 16908**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00562	U	0.0314	0.0314	1.00	0.0782	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-233/234	-0.00625	U	0.0315	0.0315	1.00	0.0799	pCi/g	12/21/18 11:09	12/27/18 15:00	1
U-235/236	0.0150	U	0.0312	0.0313	1.00	0.0573	pCi/g	12/21/18 11:09	12/27/18 15:00	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*77.6*		*30 - 105*	*12/21/18 11:09*	*12/27/18 15:00*	*1*

Lab Sample ID: LCS 300-16908/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17012 — **Prep Batch: 16908**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.46	3.130		0.629	1.00	0.0634	pCi/g	90	80 - 120		
U-233/234			3.31	3.327		0.660	1.00	0.0680	pCi/g	101	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*91.2*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8944-1 DU
Matrix: Solid
Analysis Batch: 17012

Client Sample ID: B3L2W9
Prep Type: Total/NA
Prep Batch: 16908

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0778			0.109	y	0.0727	1.00	0.0519	pCi/g			33	30
U-233/234	0.0955			0.110		0.0727	1.00	0.0465	pCi/g			15	30
U-235/236	0.0116	U		-0.000447	U y	0.0224	1.00	0.0410	pCi/g			216	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*82.8*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16888/1-A
Matrix: Solid
Analysis Batch: 17011

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16888

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00149	U	0.0747	0.0747	1.00	0.137	pCi/g	12/21/18 08:52	12/27/18 14:05	1
Pu-239/240	-0.00448	U	0.0749	0.0749	1.00	0.155	pCi/g	12/21/18 08:52	12/27/18 14:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*45.9*		*30 - 105*	*12/21/18 08:52*	*12/27/18 14:05*	*1*

Lab Sample ID: LCS 300-16888/2-A
Matrix: Solid
Analysis Batch: 17011

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16888

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.50	4.462		0.911	1.00	0.0653	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*86.8*		*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16902/1-A
Matrix: Solid
Analysis Batch: 17058

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16902

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	3.479	U	0.387	4.00	15.0	7.42	pCi/g	12/21/18 09:59	12/29/18 07:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*45.9*			*12/21/18 09:59*	*12/29/18 07:24*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Lab Sample ID: LCS 300-16902/2-A
Matrix: Solid
Analysis Batch: 17058

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16902

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			255	309.7	o	20.7	15.0	3.57	pCi/g	122	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*86.8*		

Lab Sample ID: 300-8944-1 DU
Matrix: Solid
Analysis Batch: 17058

Client Sample ID: B3L2W9
Prep Type: Total/NA
Prep Batch: 16902

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.93	U o		3.009	U o y	2.25	15.0	3.11	pCi/g			378	30

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	01/17/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-016		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval

01/17/2019 — Date

Scot Fitzgerald — Organization Manager (optional) (print and sign)

10. Agreement With Indicated Comment Disposition(s)

Date

Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

01/17/2019 — Date

Reviewer/Point of Contact (print and sign)

Scot Fitzgerald — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					Closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
1/17/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-016		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/17/2019 Jadie Kaas Date Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/17/2019 Jadie Kaas Date Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					closed

A-6004-835 (REV 1)

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR19-016
Project RTL

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-16-2019**

Technical Review By: Ellen McEntee **Date: 01-16-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 01-21-2019**

Mary Donivan
Quality Assurance Manager

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Date: 16 February 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Volatile Organics - Sample Data Groups (SDGs) SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3MMP6	11/15/18	Soil	C	8260C
B3MMR0	11/26/18	Soil	C	8260C
B3M451	11/29/18	Soil	C	8260C
B3M463	11/29/18	Soil	C	8260C
B3M459	11/29/18	Soil	C	8260C
B3M455	11/29/18	Soil	C	8260C
B3M435	11/29/18	Soil	C	8260C
B3M471	11/29/18	Soil	C	8260C
B3M439	11/29/18	Soil	C	8260C
B3M467	11/29/18	Soil	C	8260C
B3M419	11/29/18	Soil	C	8260C
B3M478	11/29/18	Soil	C	8260C
B3M423	12/03/18	Soil	C	8260C
B3M431	12/03/18	Soil	C	8260C
B3M443	12/03/18	Soil	C	8260C
B3M447	12/03/18	Soil	C	8260C
B3M427	12/03/18	Soil	C	8260C
B3M415	12/03/18	Soil	C	8260C
B3M480	12/03/18	Soil	C	8260C
B3MMR4	12/06/18	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are extraction within 14 days of sample collection and analysis within 40 days of extraction. This is a non-routine holding time identified in the SAP. Sample preservation requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved with the following exceptions.

For SDG SL31919-1, sample B3MMP6 was extracted beyond the holding time but ≤ 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR."

For SDG SL32018-1, sample B3MMR0 was extracted beyond 2X the holding time. All sample results were non-detects and should be qualified as unusable and flagged "UR."

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the MS recoveries for 1,1-dichloroethene and carbon disulfide were above the upper acceptance limit. The sample results were non-detects and should not be qualified as a result.

SDG SL32078-1
The MS and/or MSD recoveries for 1,1,2,2-tetrachloroethane and 2-hexanone were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for acetone were above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

For SDG SL32124-1, the MSD recovery for chloroethane was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the MS and MSD recoveries for chloroethane were below the lower acceptance limit but ≥20%. The chloroethane result for sample B3MMR4 was a non-detect and should be qualified as an estimate and flagged "UJ."

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable with the following exceptions.

For SDG SL32124-1, the LCS and LCSD recoveries for chloroethane were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the LCS and LCSD recoveries for chloroethane were below the lower acceptance limit but ≥40%. The chloroethane result for sample B3MMR4 was a non-detect and should be qualified as an estimate and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory

reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

LCS/LCSD Samples

All LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDL for methylene chloride was met. No other CRDL for VOCs were provided.

- **Completeness**

SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 89%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of all target analytes for samples B3MMP6 and B3MMR0 as unusable were due to extraction beyond the holding time.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike and low laboratory control sample recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
All VOCs analytes	UR	B3MMP6, B3MMR0	Extracted beyond the holding time.
1,1,2,2-tetrachloroethane, 2-hexanone	UJ	B3M451, B3M463, B3M459, B3M455, B3M435, B3M471, B3M439, B3M467, B3M419, B3M478	Low matrix spike recoveries
Chloroethane	UJ	B3M423, B3M431, B3M443, B3M447, B3M427, B3M415, B3M480, B3MMR4	Low matrix spike recoveries and low LCS recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-016		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL31919-1: B3MMP6					
SDG SL32018-1: B3MMR0					
SDG SL32078-1:B3M451, B3M463, B3M459, B3M455, B3M435, B3M471, B3M439, B3M467, B3M419, B3M478,					
SDG SL32124-1 - B3M423, B3M431, B3M443, B3M447, B3M427, B3M415, B3M480					
SDG SL32192-1 - B3MMR4					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL31919-1: 1,1-dichloroethene 134% (MS), carbon disulfide 134% (MS)

SDG SL32078-1: 1,1,2,2-tetrachloroethane 69% (MS), 2-hexanone 66%/68%, acetone 158%/137%

SDG SL32124-1: chloroethane 68% (MSD)

SDG SL32192-1: chloroethane 68%/68%

LCS/LCSD

SDG SL32124-1: chloroethane 67%/67%

SDG SL32192-1: chloroethane 66%/65%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

SDG SL31919-1: sample B3MMP6 extracted 28 days after collection

SDG SL32018-1: sample B3MMR0 extracted 30 days after collection

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDL for methylene chloride was provided, not other CRDLs were provided

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-405466/8
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/13/18 08:46	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/13/18 08:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/13/18 08:46	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 08:46	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/13/18 08:46	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/13/18 08:46	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/13/18 08:46	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/13/18 08:46	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/13/18 08:46	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/13/18 08:46	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/13/18 08:46	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/13/18 08:46	1
Acetone	6.5	U	20	6.5	ug/Kg			12/13/18 08:46	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/13/18 08:46	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/13/18 08:46	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/13/18 08:46	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/13/18 08:46	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/13/18 08:46	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/13/18 08:46	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/13/18 08:46	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/13/18 08:46	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/13/18 08:46	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/13/18 08:46	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/13/18 08:46	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 08:46	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/13/18 08:46	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/13/18 08:46	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/13/18 08:46	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/13/18 08:46	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/13/18 08:46	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/13/18 08:46	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/13/18 08:46	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/13/18 08:46	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/13/18 08:46	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/13/18 08:46*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*67 - 132*		*12/13/18 08:46*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*		*12/13/18 08:46*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/13/18 08:46*	*1*
Toluene-d8 (Surr)	*101*		*74 - 135*		*12/13/18 08:46*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405466/5
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.0		ug/Kg		102	71 - 127
1,1,2,2-Tetrachloroethane	50.0	46.8		ug/Kg		94	52 - 140
1,1,2-Trichloroethane	50.0	48.5		ug/Kg		97	79 - 122
1,1-Dichloroethane	50.0	50.1		ug/Kg		100	80 - 120
1,1-Dichloroethene	50.0	51.1		ug/Kg		102	71 - 126
1,2-Dichloroethane	50.0	49.4		ug/Kg		99	68 - 128
1,2-Dichloroethene, Total	100	105		ug/Kg		105	79 - 121
1,2-Dichloropropane	50.0	52.2		ug/Kg		104	80 - 126
2-Butanone (MEK)	50.0	47.6		ug/Kg		95	41 - 140
2-Hexanone	50.0	45.7		ug/Kg		91	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	45.0		ug/Kg		90	67 - 130
Acetone	50.0	42.1		ug/Kg		84	39 - 140
Benzene	50.0	50.2		ug/Kg		100	80 - 120
Bromodichloromethane	50.0	52.1		ug/Kg		104	78 - 124
Bromoform	50.0	48.4		ug/Kg		97	67 - 135
Bromomethane	50.0	52.6		ug/Kg		105	61 - 132
Carbon disulfide	50.0	50.2		ug/Kg		100	74 - 124
Carbon tetrachloride	50.0	51.6		ug/Kg		103	68 - 130
Chlorobenzene	50.0	50.7		ug/Kg		101	80 - 120
Chloroethane	50.0	46.2		ug/Kg		92	73 - 129
Chloroform	50.0	48.6		ug/Kg		97	78 - 120
Chloromethane	50.0	59.2		ug/Kg		118	69 - 123
cis-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	78 - 127
Dibromochloromethane	50.0	51.0		ug/Kg		102	77 - 126
Ethylbenzene	50.0	50.5		ug/Kg		101	79 - 126
Methylene Chloride	50.0	50.7		ug/Kg		101	76 - 120
Styrene	50.0	55.5		ug/Kg		111	80 - 129
Tetrachloroethene	50.0	51.5		ug/Kg		103	76 - 126
Toluene	50.0	55.2		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	53.3		ug/Kg		107	77 - 136
Trichloroethene	50.0	50.0		ug/Kg		100	66 - 130
Vinyl chloride	50.0	52.0		ug/Kg		104	56 - 134
Xylenes, Total	100	111		ug/Kg		111	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*97*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*102*		*74 - 135*

Lab Sample ID: LCSD 160-405466/6
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.0		ug/Kg		102	71 - 127	0	20
1,1,2,2-Tetrachloroethane	50.0	49.5		ug/Kg		99	52 - 140	6	20
1,1,2-Trichloroethane	50.0	49.4		ug/Kg		99	79 - 122	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405466/6
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	50.8		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	51.5		ug/Kg		103	71 - 126	1	20
1,2-Dichloroethane	50.0	48.8		ug/Kg		98	68 - 128	1	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	2	20
1,2-Dichloropropane	50.0	52.7		ug/Kg		105	80 - 126	1	20
2-Butanone (MEK)	50.0	50.8		ug/Kg		102	41 - 140	7	20
2-Hexanone	50.0	46.9		ug/Kg		94	63 - 136	3	20
4-Methyl-2-pentanone (MIBK)	50.0	46.1		ug/Kg		92	67 - 130	2	20
Acetone	50.0	45.1		ug/Kg		90	39 - 140	7	20
Benzene	50.0	50.4		ug/Kg		101	80 - 120	0	20
Bromodichloromethane	50.0	51.6		ug/Kg		103	78 - 124	1	20
Bromoform	50.0	49.1		ug/Kg		98	67 - 135	1	20
Bromomethane	50.0	50.3		ug/Kg		101	61 - 132	4	20
Carbon disulfide	50.0	50.5		ug/Kg		101	74 - 124	1	20
Carbon tetrachloride	50.0	50.4		ug/Kg		101	68 - 130	2	20
Chlorobenzene	50.0	49.8		ug/Kg		100	80 - 120	2	20
Chloroethane	50.0	45.8		ug/Kg		92	73 - 129	1	20
Chloroform	50.0	48.7		ug/Kg		97	78 - 120	0	20
Chloromethane	50.0	61.4		ug/Kg		123	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	56.9		ug/Kg		114	78 - 127	3	20
Dibromochloromethane	50.0	51.1		ug/Kg		102	77 - 126	0	20
Ethylbenzene	50.0	49.7		ug/Kg		99	79 - 126	2	20
Methylene Chloride	50.0	52.2		ug/Kg		104	76 - 120	3	20
Styrene	50.0	55.2		ug/Kg		110	80 - 129	1	20
Tetrachloroethene	50.0	50.7		ug/Kg		101	76 - 126	2	20
Toluene	50.0	53.8		ug/Kg		108	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	53.1		ug/Kg		106	77 - 136	0	20
Trichloroethene	50.0	49.9		ug/Kg		100	66 - 130	0	20
Vinyl chloride	50.0	52.8		ug/Kg		106	56 - 134	2	20
Xylenes, Total	100	110		ug/Kg		110	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-31915-D-2-A MS
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.52	U	48.7	51.1		ug/Kg	☼	105	80 - 120
1,1,2,2-Tetrachloroethane	2.4	U	48.7	45.8		ug/Kg	☼	94	78 - 120
1,1,2-Trichloroethane	1.4	U	48.7	48.5		ug/Kg	☼	100	80 - 120
1,1-Dichloroethane	0.47	U	48.7	50.2		ug/Kg	☼	103	80 - 120
1,1-Dichloroethene	1.9	U T	48.7	65.3	T	ug/Kg	☼	134	78 - 121
1,2-Dichloroethane	1.1	U	48.7	48.4		ug/Kg	☼	99	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-D-2-A MS
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.6	U	97.4	102		ug/Kg	☼	105	80 - 120
1,2-Dichloropropane	0.73	U	48.7	51.9		ug/Kg	☼	107	80 - 120
2-Butanone (MEK)	2.3	U	48.7	47.0		ug/Kg	☼	96	69 - 124
2-Hexanone	4.1	U	48.7	38.8		ug/Kg	☼	80	62 - 118
4-Methyl-2-pentanone (MIBK)	3.1	U	48.7	42.7		ug/Kg	☼	88	73 - 125
Acetone	7.8	U	48.7	50.2		ug/Kg	☼	103	54 - 139
Benzene	0.31	U	48.7	49.1		ug/Kg	☼	101	80 - 120
Bromodichloromethane	0.60	U	48.7	51.1		ug/Kg	☼	105	80 - 120
Bromoform	2.3	U	48.7	49.6		ug/Kg	☼	102	80 - 125
Bromomethane	2.9	U	48.7	48.8		ug/Kg	☼	100	70 - 126
Carbon disulfide	0.83	U T	48.7	65.2	T	ug/Kg	☼	134	79 - 121
Carbon tetrachloride	0.62	U	48.7	49.9		ug/Kg	☼	102	80 - 120
Chlorobenzene	0.98	U	48.7	49.6		ug/Kg	☼	102	80 - 120
Chloroethane	2.4	U	48.7	49.1		ug/Kg	☼	101	64 - 133
Chloroform	0.46	U	48.7	49.2		ug/Kg	☼	101	80 - 120
Chloromethane	0.79	U	48.7	56.5		ug/Kg	☼	116	75 - 120
cis-1,3-Dichloropropene	2.6	U	48.7	54.2		ug/Kg	☼	111	80 - 120
Dibromochloromethane	1.5	U	48.7	50.4		ug/Kg	☼	104	80 - 120
Ethylbenzene	0.83	U	48.7	49.3		ug/Kg	☼	101	80 - 120
Methylene Chloride	1.9	U	48.7	49.9		ug/Kg	☼	103	77 - 123
Styrene	2.4	U	48.7	52.7		ug/Kg	☼	108	80 - 120
Tetrachloroethene	0.68	U	48.7	48.0		ug/Kg	☼	99	80 - 120
Toluene	3.0	U	48.7	53.5		ug/Kg	☼	110	80 - 124
trans-1,3-Dichloropropene	2.1	U	48.7	52.4		ug/Kg	☼	108	80 - 122
Trichloroethene	0.47	U	48.7	51.4		ug/Kg	☼	106	79 - 120
Vinyl chloride	0.52	U	48.7	51.8		ug/Kg	☼	106	71 - 120
Xylenes, Total	1.0	U	97.4	106		ug/Kg	☼	109	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*97*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-31915-E-2-A MSD
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.52	U	47.6	49.8		ug/Kg	☼	105	80 - 120	2	20
1,1,2,2-Tetrachloroethane	2.4	U	47.6	43.0		ug/Kg	☼	90	78 - 120	6	20
1,1,2-Trichloroethane	1.4	U	47.6	48.0		ug/Kg	☼	101	80 - 120	1	20
1,1-Dichloroethane	0.47	U	47.6	49.4		ug/Kg	☼	104	80 - 120	2	20
1,1-Dichloroethene	1.9	U T	47.6	50.0	y	ug/Kg	☼	105	78 - 121	26	20
1,2-Dichloroethane	1.1	U	47.6	47.8		ug/Kg	☼	100	78 - 117	1	20
1,2-Dichloroethene, Total	1.6	U	95.3	103		ug/Kg	☼	108	80 - 120	1	20
1,2-Dichloropropane	0.73	U	47.6	51.6		ug/Kg	☼	108	80 - 120	0	20
2-Butanone (MEK)	2.3	U	47.6	46.4		ug/Kg	☼	97	69 - 124	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-E-2-A MSD
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.1	U	47.6	36.6		ug/Kg	☼	77	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	3.1	U	47.6	43.1		ug/Kg	☼	90	73 - 125	1	20
Acetone	7.8	U	47.6	54.0		ug/Kg	☼	113	54 - 139	7	20
Benzene	0.31	U	47.6	48.9		ug/Kg	☼	103	80 - 120	0	20
Bromodichloromethane	0.60	U	47.6	50.1		ug/Kg	☼	105	80 - 120	2	20
Bromoform	2.3	U	47.6	50.2		ug/Kg	☼	105	80 - 125	1	20
Bromomethane	2.9	U	47.6	48.0		ug/Kg	☼	101	70 - 126	2	20
Carbon disulfide	0.83	U T	47.6	47.9	y	ug/Kg	☼	101	79 - 121	31	20
Carbon tetrachloride	0.62	U	47.6	48.8		ug/Kg	☼	103	80 - 120	2	20
Chlorobenzene	0.98	U	47.6	47.9		ug/Kg	☼	101	80 - 120	3	20
Chloroethane	2.4	U	47.6	44.4		ug/Kg	☼	93	64 - 133	10	20
Chloroform	0.46	U	47.6	47.4		ug/Kg	☼	99	80 - 120	4	20
Chloromethane	0.79	U	47.6	56.9		ug/Kg	☼	120	75 - 120	1	20
cis-1,3-Dichloropropene	2.6	U	47.6	52.7		ug/Kg	☼	111	80 - 120	3	20
Dibromochloromethane	1.5	U	47.6	49.7		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.83	U	47.6	47.7		ug/Kg	☼	100	80 - 120	3	20
Methylene Chloride	1.9	U	47.6	50.2		ug/Kg	☼	105	77 - 123	0	20
Styrene	2.4	U	47.6	51.9		ug/Kg	☼	109	80 - 120	2	20
Tetrachloroethene	0.68	U	47.6	46.4		ug/Kg	☼	97	80 - 120	3	20
Toluene	3.0	U	47.6	52.4		ug/Kg	☼	110	80 - 124	2	20
trans-1,3-Dichloropropene	2.1	U	47.6	50.9		ug/Kg	☼	107	80 - 122	3	20
Trichloroethene	0.47	U	47.6	51.2		ug/Kg	☼	108	79 - 120	0	20
Vinyl chloride	0.52	U	47.6	51.4		ug/Kg	☼	108	71 - 120	1	20
Xylenes, Total	1.0	U	95.3	104		ug/Kg	☼	109	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31919-2	B3MMP6	114	99	109	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31915-D-2-A MS	Matrix Spike	98	102	97	100
160-31915-E-2-A MSD	Matrix Spike Duplicate	99	104	100	104
LCS 160-405466/5	Lab Control Sample	96	97	98	102
LCSD 160-405466/6	Lab Control Sample Dup	96	100	100	100
MB 160-405466/8	Method Blank	101	99	102	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31919-2	B3MMP6	60	76	74	66	76	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31915-A-1-B MS - DL	Matrix Spike	63	81	75	76	76	82
160-31915-A-1-C MSD - DL	Matrix Spike Duplicate	82	83	73	73	78	89

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-407502/8
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/26/18 07:01	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/26/18 07:01	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/26/18 07:01	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/26/18 07:01	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/26/18 07:01	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/26/18 07:01	1
Acetone	6.5	U	20	6.5	ug/Kg			12/26/18 07:01	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/26/18 07:01	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/26/18 07:01	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/26/18 07:01	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/26/18 07:01	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/26/18 07:01	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/26/18 07:01	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/26/18 07:01	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/26/18 07:01	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/26/18 07:01	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/26/18 07:01	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/26/18 07:01	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/26/18 07:01	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/26/18 07:01	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/26/18 07:01	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/26/18 07:01	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/26/18 07:01	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/26/18 07:01	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/26/18 07:01	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/26/18 07:01	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/26/18 07:01	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/26/18 07:01*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*		*12/26/18 07:01*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 150*		*12/26/18 07:01*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 143*		*12/26/18 07:01*	*1*
Toluene-d8 (Surr)	*100*		*74 - 135*		*12/26/18 07:01*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-407502/5
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	51.9		ug/Kg		104	71 - 127
1,1,2,2-Tetrachloroethane	50.0	49.0		ug/Kg		98	52 - 140
1,1,2-Trichloroethane	50.0	49.0		ug/Kg		98	79 - 122
1,1-Dichloroethane	50.0	50.4		ug/Kg		101	80 - 120
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126
1,2-Dichloroethane	50.0	47.8		ug/Kg		96	68 - 128
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121
1,2-Dichloropropane	50.0	51.3		ug/Kg		103	80 - 126
2-Butanone (MEK)	50.0	46.0		ug/Kg		92	41 - 140
2-Hexanone	50.0	43.2		ug/Kg		86	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	43.4		ug/Kg		87	39 - 140
Benzene	50.0	52.1		ug/Kg		104	80 - 120
Bromodichloromethane	50.0	49.6		ug/Kg		99	78 - 124
Bromoform	50.0	48.8		ug/Kg		98	67 - 135
Bromomethane	50.0	50.7		ug/Kg		101	61 - 132
Carbon disulfide	50.0	53.0		ug/Kg		106	74 - 124
Carbon tetrachloride	50.0	51.1		ug/Kg		102	68 - 130
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120
Chloroethane	50.0	48.1		ug/Kg		96	73 - 129
Chloroform	50.0	49.1		ug/Kg		98	78 - 120
Chloromethane	50.0	45.4		ug/Kg		91	69 - 123
cis-1,3-Dichloropropene	50.0	54.3		ug/Kg		109	78 - 127
Dibromochloromethane	50.0	50.3		ug/Kg		101	77 - 126
Ethylbenzene	50.0	51.4		ug/Kg		103	79 - 126
Methylene Chloride	50.0	51.6		ug/Kg		103	76 - 120
Styrene	50.0	54.2		ug/Kg		108	80 - 129
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	52.7		ug/Kg		105	77 - 136
Trichloroethene	50.0	50.5		ug/Kg		101	66 - 130
Vinyl chloride	50.0	53.8		ug/Kg		108	56 - 134
Xylenes, Total	100	114		ug/Kg		114	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.5		ug/Kg		103	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	52.8		ug/Kg		106	52 - 140	7	20
1,1,2-Trichloroethane	50.0	50.9		ug/Kg		102	79 - 122	4	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-407502/6
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	51.0		ug/Kg		102	80 - 120	1	20
1,1-Dichloroethene	50.0	53.0		ug/Kg		106	71 - 126	1	20
1,2-Dichloroethane	50.0	48.5		ug/Kg		97	68 - 128	2	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	0	20
1,2-Dichloropropane	50.0	52.3		ug/Kg		105	80 - 126	2	20
2-Butanone (MEK)	50.0	50.7		ug/Kg		101	41 - 140	10	20
2-Hexanone	50.0	48.7		ug/Kg		97	63 - 136	12	20
4-Methyl-2-pentanone (MIBK)	50.0	46.4		ug/Kg		93	67 - 130	7	20
Acetone	50.0	47.0		ug/Kg		94	39 - 140	8	20
Benzene	50.0	52.1		ug/Kg		104	80 - 120	0	20
Bromodichloromethane	50.0	50.8		ug/Kg		102	78 - 124	2	20
Bromoform	50.0	52.8		ug/Kg		106	67 - 135	8	20
Bromomethane	50.0	50.2		ug/Kg		100	61 - 132	1	20
Carbon disulfide	50.0	52.8		ug/Kg		106	74 - 124	0	20
Carbon tetrachloride	50.0	50.9		ug/Kg		102	68 - 130	0	20
Chlorobenzene	50.0	51.9		ug/Kg		104	80 - 120	0	20
Chloroethane	50.0	46.2		ug/Kg		92	73 - 129	4	20
Chloroform	50.0	49.8		ug/Kg		100	78 - 120	2	20
Chloromethane	50.0	45.1		ug/Kg		90	69 - 123	1	20
cis-1,3-Dichloropropene	50.0	55.7		ug/Kg		111	78 - 127	3	20
Dibromochloromethane	50.0	52.9		ug/Kg		106	77 - 126	5	20
Ethylbenzene	50.0	51.9		ug/Kg		104	79 - 126	1	20
Methylene Chloride	50.0	52.2		ug/Kg		104	76 - 120	1	20
Styrene	50.0	55.0		ug/Kg		110	80 - 129	2	20
Tetrachloroethene	50.0	51.6		ug/Kg		103	76 - 126	1	20
Toluene	50.0	54.8		ug/Kg		110	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	55.1		ug/Kg		110	77 - 136	4	20
Trichloroethene	50.0	50.3		ug/Kg		101	66 - 130	0	20
Vinyl chloride	50.0	51.6		ug/Kg		103	56 - 134	4	20
Xylenes, Total	100	114		ug/Kg		114	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-31841-D-4-A MS
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.40	U	45.0	49.0		ug/Kg	☼	109	80 - 120
1,1,2,2-Tetrachloroethane	1.8	U	45.0	43.6		ug/Kg	☼	97	78 - 120
1,1,2-Trichloroethane	1.1	U	45.0	42.8		ug/Kg	☼	95	80 - 120
1,1-Dichloroethane	0.36	U	45.0	45.8		ug/Kg	☼	102	80 - 120
1,1-Dichloroethene	1.5	U	45.0	47.0		ug/Kg	☼	104	78 - 121
1,2-Dichloroethane	0.80	U	45.0	45.9		ug/Kg	☼	102	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-D-4-A MS
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.2	U	90.1	93.2		ug/Kg	☼	103	80 - 120
1,2-Dichloropropane	0.56	U	45.0	45.6		ug/Kg	☼	101	80 - 120
2-Butanone (MEK)	1.8	U	45.0	43.5		ug/Kg	☼	97	69 - 124
2-Hexanone	3.1	U	45.0	36.8		ug/Kg	☼	82	62 - 118
4-Methyl-2-pentanone (MIBK)	2.3	U	45.0	37.6		ug/Kg	☼	83	73 - 125
Acetone	6.0	U	45.0	40.1		ug/Kg	☼	89	54 - 139
Benzene	0.24	U	45.0	45.7		ug/Kg	☼	101	80 - 120
Bromodichloromethane	0.46	U	45.0	46.4		ug/Kg	☼	103	80 - 120
Bromoform	1.8	U	45.0	46.2		ug/Kg	☼	103	80 - 125
Bromomethane	2.2	U	45.0	43.9		ug/Kg	☼	97	70 - 126
Carbon disulfide	0.64	U	45.0	47.0		ug/Kg	☼	104	79 - 121
Carbon tetrachloride	0.47	U	45.0	48.0		ug/Kg	☼	107	80 - 120
Chlorobenzene	0.75	U	45.0	44.5		ug/Kg	☼	99	80 - 120
Chloroethane	1.8	U	45.0	42.4		ug/Kg	☼	94	64 - 133
Chloroform	0.35	U	45.0	45.9		ug/Kg	☼	102	80 - 120
Chloromethane	0.60	U	45.0	39.5		ug/Kg	☼	88	75 - 120
cis-1,3-Dichloropropene	1.9	U	45.0	49.2		ug/Kg	☼	109	80 - 120
Dibromochloromethane	1.1	U	45.0	46.0		ug/Kg	☼	102	80 - 120
Ethylbenzene	0.64	U	45.0	44.6		ug/Kg	☼	99	80 - 120
Methylene Chloride	1.5	U	45.0	46.1		ug/Kg	☼	102	77 - 123
Styrene	1.8	U	45.0	46.4		ug/Kg	☼	103	80 - 120
Tetrachloroethene	0.52	U	45.0	45.5		ug/Kg	☼	101	80 - 120
Toluene	2.3	U	45.0	46.4		ug/Kg	☼	103	80 - 124
trans-1,3-Dichloropropene	1.6	U	45.0	47.2		ug/Kg	☼	105	80 - 122
Trichloroethene	0.36	U	45.0	46.2		ug/Kg	☼	103	79 - 120
Vinyl chloride	0.40	U	45.0	42.9		ug/Kg	☼	95	71 - 120
Xylenes, Total	0.78	U T	90.1	96.1		ug/Kg	☼	107	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*105*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.40	U	39.3	42.6		ug/Kg	☼	109	80 - 120	14	20
1,1,2,2-Tetrachloroethane	1.8	U	39.3	40.6		ug/Kg	☼	104	78 - 120	7	20
1,1,2-Trichloroethane	1.1	U	39.3	40.7		ug/Kg	☼	104	80 - 120	5	20
1,1-Dichloroethane	0.36	U	39.3	40.9		ug/Kg	☼	104	80 - 120	11	20
1,1-Dichloroethene	1.5	U	39.3	40.9		ug/Kg	☼	104	78 - 121	14	20
1,2-Dichloroethane	0.80	U	39.3	40.4		ug/Kg	☼	103	78 - 117	13	20
1,2-Dichloroethene, Total	1.2	U	78.5	82.9		ug/Kg	☼	106	80 - 120	12	20
1,2-Dichloropropane	0.56	U	39.3	40.7		ug/Kg	☼	104	80 - 120	11	20
2-Butanone (MEK)	1.8	U	39.3	37.9		ug/Kg	☼	97	69 - 124	14	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.1	U	39.3	37.1		ug/Kg	☼	95	62 - 118	1	20
4-Methyl-2-pentanone (MIBK)	2.3	U	39.3	36.5		ug/Kg	☼	93	73 - 125	3	20
Acetone	6.0	U	39.3	38.2		ug/Kg	☼	97	54 - 139	5	20
Benzene	0.24	U	39.3	41.0		ug/Kg	☼	104	80 - 120	11	20
Bromodichloromethane	0.46	U	39.3	41.5		ug/Kg	☼	106	80 - 120	11	20
Bromoform	1.8	U	39.3	43.1		ug/Kg	☼	110	80 - 125	7	20
Bromomethane	2.2	U	39.3	38.9		ug/Kg	☼	99	70 - 126	12	20
Carbon disulfide	0.64	U	39.3	40.9		ug/Kg	☼	104	79 - 121	14	20
Carbon tetrachloride	0.47	U	39.3	41.2		ug/Kg	☼	105	80 - 120	15	20
Chlorobenzene	0.75	U	39.3	40.8		ug/Kg	☼	104	80 - 120	9	20
Chloroethane	1.8	U	39.3	37.7		ug/Kg	☼	96	64 - 133	12	20
Chloroform	0.35	U	39.3	40.2		ug/Kg	☼	103	80 - 120	13	20
Chloromethane	0.60	U	39.3	35.6		ug/Kg	☼	91	75 - 120	10	20
cis-1,3-Dichloropropene	1.9	U	39.3	43.7		ug/Kg	☼	111	80 - 120	12	20
Dibromochloromethane	1.1	U	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32018-1	B3MMR0	110	98	105	102

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31841-D-4-A MS	Matrix Spike	102	99	105	101
160-31841-E-4-A MSD	Matrix Spike Duplicate	103	101	106	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32018-1	B3MMR0	67	76	78	65	77	81
160-32018-1 MS	B3MMR0	82	85	83	83	83	90
160-32018-1 MSD	B3MMR0	80	82	80	79	81	86

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: 160-32078-18 MS
Matrix: Soil
Analysis Batch: 405738

Client Sample ID: B3M419
Prep Type: Total/NA
Prep Batch: 405734

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.53	U	49.8	54.0		ug/Kg	☼	108	80 - 120
1,1,2,2-Tetrachloroethane	2.4	U T	49.8	34.4	T	ug/Kg	☼	69	78 - 120
1,1,2-Trichloroethane	1.4	U	49.8	49.4		ug/Kg	☼	99	80 - 120
1,1-Dichloroethane	0.48	U	49.8	52.1		ug/Kg	☼	105	80 - 120
1,1-Dichloroethene	2.0	U	49.8	50.1		ug/Kg	☼	101	78 - 121
1,2-Dichloroethane	1.1	U	49.8	51.6		ug/Kg	☼	104	78 - 117
1,2-Dichloroethene, Total	1.6	U	99.6	103		ug/Kg	☼	103	80 - 120
1,2-Dichloropropane	0.74	U	49.8	51.9		ug/Kg	☼	104	80 - 120
2-Butanone (MEK)	2.4	U	49.8	45.7		ug/Kg	☼	92	69 - 124
2-Hexanone	4.1	U	49.8	32.8		ug/Kg	☼	66	62 - 118
4-Methyl-2-pentanone (MIBK)	3.1	U	49.8	39.9		ug/Kg	☼	80	73 - 125
Acetone	7.9	U T	49.8	78.6	T	ug/Kg	☼	158	54 - 139
Benzene	0.32	U	49.8	50.8		ug/Kg	☼	102	80 - 120
Bromodichloromethane	0.61	U	49.8	53.2		ug/Kg	☼	107	80 - 120
Bromoform	2.4	U	49.8	50.1		ug/Kg	☼	101	80 - 125
Bromomethane	2.9	U	49.8	50.8		ug/Kg	☼	102	70 - 126
Carbon disulfide	0.84	U	49.8	48.1		ug/Kg	☼	96	79 - 121
Carbon tetrachloride	0.62	U	49.8	53.2		ug/Kg	☼	107	80 - 120
Chlorobenzene	0.99	U	49.8	50.1		ug/Kg	☼	101	80 - 120
Chloroethane	2.4	U	49.8	51.6		ug/Kg	☼	104	64 - 133
Chloroform	0.47	U	49.8	51.7		ug/Kg	☼	104	80 - 120
Chloromethane	0.80	U T	49.8	59.5		ug/Kg	☼	120	75 - 120
cis-1,3-Dichloropropene	2.6	U	49.8	54.4		ug/Kg	☼	109	80 - 120
Dibromochloromethane	1.5	U	49.8	51.6		ug/Kg	☼	104	80 - 120
Ethylbenzene	0.84	U	49.8	48.9		ug/Kg	☼	98	80 - 120
Methylene Chloride	1.9	U	49.8	52.8		ug/Kg	☼	106	77 - 123
Styrene	2.4	U	49.8	52.9		ug/Kg	☼	106	80 - 120
Tetrachloroethene	0.69	U	49.8	45.8		ug/Kg	☼	92	80 - 120
Toluene	3.1	U	49.8	53.0		ug/Kg	☼	106	80 - 124
trans-1,3-Dichloropropene	2.1	U	49.8	51.0		ug/Kg	☼	102	80 - 122
Trichloroethene	0.48	U T	49.8	60.6	T	ug/Kg	☼	122	79 - 120
Vinyl chloride	0.53	U	49.8	53.8		ug/Kg	☼	108	71 - 120
Xylenes, Total	1.0	U	99.6	105		ug/Kg	☼	105	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*67 - 132*
4-Bromofluorobenzene (Surr)	*92*		*59 - 150*
Dibromofluoromethane (Surr)	*95*		*53 - 143*
Toluene-d8 (Surr)	*97*		*74 - 135*

Lab Sample ID: 160-32078-18 MSD
Matrix: Soil
Analysis Batch: 405738

Client Sample ID: B3M419
Prep Type: Total/NA
Prep Batch: 405734

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.53	U	47.6	49.3		ug/Kg	☼	104	80 - 120	9	20
1,1,2,2-Tetrachloroethane	2.4	U T	47.6	38.1		ug/Kg	☼	80	78 - 120	10	20
1,1,2-Trichloroethane	1.4	U	47.6	47.0		ug/Kg	☼	99	80 - 120	5	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32078-18 MSD
Matrix: Soil
Analysis Batch: 405738

Client Sample ID: B3M419
Prep Type: Total/NA
Prep Batch: 405734

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	0.48	U	47.6	48.4		ug/Kg	☼	102	80 - 120	7	20
1,1-Dichloroethene	2.0	U	47.6	48.9		ug/Kg	☼	103	78 - 121	2	20
1,2-Dichloroethane	1.1	U	47.6	48.0		ug/Kg	☼	101	78 - 117	7	20
1,2-Dichloroethene, Total	1.6	U	95.1	102		ug/Kg	☼	107	80 - 120	1	20
1,2-Dichloropropane	0.74	U	47.6	51.0		ug/Kg	☼	107	80 - 120	2	20
2-Butanone (MEK)	2.4	U	47.6	44.9		ug/Kg	☼	94	69 - 124	2	20
2-Hexanone	4.1	U	47.6	32.5		ug/Kg	☼	68	62 - 118	1	20
4-Methyl-2-pentanone (MIBK)	3.1	U	47.6	40.5		ug/Kg	☼	85	73 - 125	2	20
Acetone	7.9	U T	47.6	65.3		ug/Kg	☼	137	54 - 139	18	20
Benzene	0.32	U	47.6	48.9		ug/Kg	☼	103	80 - 120	4	20
Bromodichloromethane	0.61	U	47.6	49.8		ug/Kg	☼	105	80 - 120	7	20
Bromoform	2.4	U	47.6	49.9		ug/Kg	☼	105	80 - 125	0	20
Bromomethane	2.9	U	47.6	48.6		ug/Kg	☼	102	70 - 126	4	20
Carbon disulfide	0.84	U	47.6	47.0		ug/Kg	☼	99	79 - 121	2	20
Carbon tetrachloride	0.62	U	47.6	48.8		ug/Kg	☼	103	80 - 120	9	20
Chlorobenzene	0.99	U	47.6	48.1		ug/Kg	☼	101	80 - 120	4	20
Chloroethane	2.4	U	47.6	44.9		ug/Kg	☼	94	64 - 133	14	20
Chloroform	0.47	U	47.6	48.2		ug/Kg	☼	101	80 - 120	7	20
Chloromethane	0.80	U T	47.6	58.1	T	ug/Kg	☼	122	75 - 120	2	20
cis-1,3-Dichloropropene	2.6	U	47.6	52.6		ug/Kg	☼	111	80 - 120	3	20
Dibromochloromethane	1.5	U	47.6	49.7		ug/Kg	☼	105	80 - 120	4	20
Ethylbenzene	0.84	U	47.6	47.8		ug/Kg	☼	100	80 - 120	2	20
Methylene Chloride	1.9	U	47.6	50.8		ug/Kg	☼	107	77 - 123	4	20
Styrene	2.4	U	47.6	52.7		ug/Kg	☼	111	80 - 120	1	20
Tetrachloroethene	0.69	U	47.6	46.1		ug/Kg	☼	97	80 - 120	1	20
Toluene	3.1	U	47.6	52.2		ug/Kg	☼	110	80 - 124	2	20
trans-1,3-Dichloropropene	2.1	U	47.6	50.0		ug/Kg	☼	105	80 - 122	2	20
Trichloroethene	0.48	U T	47.6	56.2		ug/Kg	☼	118	79 - 120	7	20
Vinyl chloride	0.53	U	47.6	50.9		ug/Kg	☼	107	71 - 120	6	20
Xylenes, Total	1.0	U	95.1	102		ug/Kg	☼	107	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*67 - 132*
4-Bromofluorobenzene (Surr)	*100*		*59 - 150*
Dibromofluoromethane (Surr)	*96*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Lab Sample ID: MB 160-405738/8
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/13/18 19:46	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/13/18 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/13/18 19:46	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 19:46	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/13/18 19:46	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/13/18 19:46	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 160-405738/8
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/13/18 19:46	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/13/18 19:46	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/13/18 19:46	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/13/18 19:46	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/13/18 19:46	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/13/18 19:46	1
Acetone	6.5	U	20	6.5	ug/Kg			12/13/18 19:46	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/13/18 19:46	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/13/18 19:46	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/13/18 19:46	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/13/18 19:46	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/13/18 19:46	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/13/18 19:46	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/13/18 19:46	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/13/18 19:46	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/13/18 19:46	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/13/18 19:46	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/13/18 19:46	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/13/18 19:46	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/13/18 19:46	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/13/18 19:46	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/13/18 19:46	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/13/18 19:46	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/13/18 19:46	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/13/18 19:46	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/13/18 19:46	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/13/18 19:46	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/13/18 19:46	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/13/18 19:46*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*67 - 132*		*12/13/18 19:46*	*1*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*		*12/13/18 19:46*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 143*		*12/13/18 19:46*	*1*
Toluene-d8 (Surr)	*101*		*74 - 135*		*12/13/18 19:46*	*1*

Lab Sample ID: LCS 160-405738/5
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	50.6		ug/Kg		101	71 - 127
1,1,2,2-Tetrachloroethane	50.0	46.5		ug/Kg		93	52 - 140
1,1,2-Trichloroethane	50.0	48.6		ug/Kg		97	79 - 122
1,1-Dichloroethane	50.0	50.1		ug/Kg		100	80 - 120

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-405738/5
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	50.4		ug/Kg		101	71 - 126
1,2-Dichloroethane	50.0	49.0		ug/Kg		98	68 - 128
1,2-Dichloroethene, Total	100	104		ug/Kg		104	79 - 121
1,2-Dichloropropane	50.0	51.2		ug/Kg		102	80 - 126
2-Butanone (MEK)	50.0	51.4		ug/Kg		103	41 - 140
2-Hexanone	50.0	43.6		ug/Kg		87	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	44.5		ug/Kg		89	67 - 130
Acetone	50.0	41.9		ug/Kg		84	39 - 140
Benzene	50.0	50.0		ug/Kg		100	80 - 120
Bromodichloromethane	50.0	52.4		ug/Kg		105	78 - 124
Bromoform	50.0	47.4		ug/Kg		95	67 - 135
Bromomethane	50.0	51.5		ug/Kg		103	61 - 132
Carbon disulfide	50.0	49.7		ug/Kg		99	74 - 124
Carbon tetrachloride	50.0	50.7		ug/Kg		101	68 - 130
Chlorobenzene	50.0	51.1		ug/Kg		102	80 - 120
Chloroethane	50.0	45.0		ug/Kg		90	73 - 129
Chloroform	50.0	48.4		ug/Kg		97	78 - 120
Chloromethane	50.0	61.1		ug/Kg		122	69 - 123
cis-1,3-Dichloropropene	50.0	55.5		ug/Kg		111	78 - 127
Dibromochloromethane	50.0	50.9		ug/Kg		102	77 - 126
Ethylbenzene	50.0	50.7		ug/Kg		101	79 - 126
Methylene Chloride	50.0	51.4		ug/Kg		103	76 - 120
Styrene	50.0	55.1		ug/Kg		110	80 - 129
Tetrachloroethene	50.0	49.8		ug/Kg		100	76 - 126
Toluene	50.0	54.4		ug/Kg		109	76 - 136
trans-1,3-Dichloropropene	50.0	52.7		ug/Kg		105	77 - 136
Trichloroethene	50.0	50.2		ug/Kg		100	66 - 130
Vinyl chloride	50.0	57.0		ug/Kg		114	56 - 134
Xylenes, Total	100	110		ug/Kg		110	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*93*		*59 - 150*
Dibromofluoromethane (Surr)	*97*		*53 - 143*
Toluene-d8 (Surr)	*97*		*74 - 135*

Lab Sample ID: LCSD 160-405738/6
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.6		ug/Kg		103	71 - 127	2	20
1,1,2,2-Tetrachloroethane	50.0	47.4		ug/Kg		95	52 - 140	2	20
1,1,2-Trichloroethane	50.0	49.3		ug/Kg		99	79 - 122	1	20
1,1-Dichloroethane	50.0	51.1		ug/Kg		102	80 - 120	2	20
1,1-Dichloroethene	50.0	52.1		ug/Kg		104	71 - 126	3	20
1,2-Dichloroethane	50.0	48.8		ug/Kg		98	68 - 128	0	20
1,2-Dichloroethene, Total	100	107		ug/Kg		107	79 - 121	4	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405738/6
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	50.0	52.2		ug/Kg		104	80 - 126	2	20
2-Butanone (MEK)	50.0	48.4		ug/Kg		97	41 - 140	6	20
2-Hexanone	50.0	44.1		ug/Kg		88	63 - 136	1	20
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130	3	20
Acetone	50.0	40.1		ug/Kg		80	39 - 140	4	20
Benzene	50.0	50.7		ug/Kg		101	80 - 120	1	20
Bromodichloromethane	50.0	52.4		ug/Kg		105	78 - 124	0	20
Bromoform	50.0	49.0		ug/Kg		98	67 - 135	3	20
Bromomethane	50.0	49.7		ug/Kg		99	61 - 132	3	20
Carbon disulfide	50.0	50.8		ug/Kg		102	74 - 124	2	20
Carbon tetrachloride	50.0	50.6		ug/Kg		101	68 - 130	0	20
Chlorobenzene	50.0	51.0		ug/Kg		102	80 - 120	0	20
Chloroethane	50.0	45.7		ug/Kg		91	73 - 129	1	20
Chloroform	50.0	49.5		ug/Kg		99	78 - 120	2	20
Chloromethane	50.0	58.4		ug/Kg		117	69 - 123	4	20
cis-1,3-Dichloropropene	50.0	56.5		ug/Kg		113	78 - 127	2	20
Dibromochloromethane	50.0	50.2		ug/Kg		100	77 - 126	1	20
Ethylbenzene	50.0	51.1		ug/Kg		102	79 - 126	1	20
Methylene Chloride	50.0	51.5		ug/Kg		103	76 - 120	0	20
Styrene	50.0	54.9		ug/Kg		110	80 - 129	0	20
Tetrachloroethene	50.0	50.8		ug/Kg		102	76 - 126	2	20
Toluene	50.0	53.7		ug/Kg		107	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	52.6		ug/Kg		105	77 - 136	0	20
Trichloroethene	50.0	50.4		ug/Kg		101	66 - 130	0	20
Vinyl chloride	50.0	55.3		ug/Kg		111	56 - 134	3	20
Xylenes, Total	100	110		ug/Kg		110	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32078-10	B3M451	109	101	105	101
160-32078-11	B3M463	106	101	106	100
160-32078-12	B3M459	107	101	104	102
160-32078-13	B3M455	104	100	105	102
160-32078-14	B3M435	107	102	105	102
160-32078-15	B3M471	112	99	109	100
160-32078-16	B3M439	114	104	105	103
160-32078-17	B3M467	111	99	106	102
160-32078-18	B3M419	111	100	105	101
160-32078-18 MS	B3M419	101	92	95	97
160-32078-18 MSD	B3M419	100	100	96	101
160-32078-19	B3M478	114	101	111	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405738/5	Lab Control Sample	94	93	97	97
LCSD 160-405738/6	Lab Control Sample Dup	94	96	99	100
MB 160-405738/8	Method Blank	97	96	103	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32078-10	B3M451	70	79	82	65	74	86
160-32078-10 MS	B3M451	76	80	82	73	76	84
160-32078-10 MSD	B3M451	82	77	77	67	74	86
160-32078-11	B3M463	74	82	81	67	75	83
160-32078-12	B3M459	76	81	78	64	72	82
160-32078-13 - DL	B3M455	67	80	77	59	71	86
160-32078-14 - DL	B3M435	67	78	72	59	69	85
160-32078-15	B3M471	79	78	79	64	72	79
160-32078-16	B3M439	76	76	80	62	71	77

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-406161/8
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/17/18 14:05	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/17/18 14:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/17/18 14:05	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/17/18 14:05	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/17/18 14:05	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/17/18 14:05	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/17/18 14:05	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/17/18 14:05	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/17/18 14:05	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/17/18 14:05	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/17/18 14:05	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/17/18 14:05	1
Acetone	6.5	U	20	6.5	ug/Kg			12/17/18 14:05	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/17/18 14:05	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/17/18 14:05	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/17/18 14:05	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/17/18 14:05	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/17/18 14:05	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/17/18 14:05	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/17/18 14:05	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/17/18 14:05	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/17/18 14:05	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/17/18 14:05	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/17/18 14:05	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/17/18 14:05	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/17/18 14:05	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/17/18 14:05	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/17/18 14:05	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/17/18 14:05	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/17/18 14:05	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/17/18 14:05	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/17/18 14:05	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/17/18 14:05	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/17/18 14:05	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/17/18 14:05*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*		*12/17/18 14:05*	*1*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*		*12/17/18 14:05*	*1*
Dibromofluoromethane (Surr)	*98*		*53 - 143*		*12/17/18 14:05*	*1*
Toluene-d8 (Surr)	*98*		*74 - 135*		*12/17/18 14:05*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406161/5
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	47.4		ug/Kg		95	71 - 127
1,1,2,2-Tetrachloroethane	50.0	48.7		ug/Kg		97	52 - 140
1,1,2-Trichloroethane	50.0	51.6		ug/Kg		103	79 - 122
1,1-Dichloroethane	50.0	49.9		ug/Kg		100	80 - 120
1,1-Dichloroethene	50.0	54.3		ug/Kg		109	71 - 126
1,2-Dichloroethane	50.0	43.9		ug/Kg		88	68 - 128
1,2-Dichloroethene, Total	100	113		ug/Kg		113	79 - 121
1,2-Dichloropropane	50.0	54.1		ug/Kg		108	80 - 126
2-Butanone (MEK)	50.0	47.8		ug/Kg		96	41 - 140
2-Hexanone	50.0	43.6		ug/Kg		87	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	43.2		ug/Kg		86	67 - 130
Acetone	50.0	40.3		ug/Kg		81	39 - 140
Benzene	50.0	51.7		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	49.2		ug/Kg		98	78 - 124
Bromoform	50.0	46.6		ug/Kg		93	67 - 135
Bromomethane	50.0	41.0		ug/Kg		82	61 - 132
Carbon disulfide	50.0	53.6		ug/Kg		107	74 - 124
Carbon tetrachloride	50.0	46.3		ug/Kg		93	68 - 130
Chlorobenzene	50.0	49.9		ug/Kg		100	80 - 120
Chloroethane	50.0	33.5	o	ug/Kg		67	73 - 129
Chloroform	50.0	47.0		ug/Kg		94	78 - 120
Chloromethane	50.0	46.2		ug/Kg		92	69 - 123
cis-1,3-Dichloropropene	50.0	56.9		ug/Kg		114	78 - 127
Dibromochloromethane	50.0	50.6		ug/Kg		101	77 - 126
Ethylbenzene	50.0	49.7		ug/Kg		99	79 - 126
Methylene Chloride	50.0	54.4		ug/Kg		109	76 - 120
Styrene	50.0	55.9		ug/Kg		112	80 - 129
Tetrachloroethene	50.0	51.4		ug/Kg		103	76 - 126
Toluene	50.0	54.9		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	52.8		ug/Kg		106	77 - 136
Trichloroethene	50.0	50.1		ug/Kg		100	66 - 130
Vinyl chloride	50.0	41.2		ug/Kg		82	56 - 134
Xylenes, Total	100	111		ug/Kg		111	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*86*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*96*		*53 - 143*
Toluene-d8 (Surr)	*99*		*74 - 135*

Lab Sample ID: LCSD 160-406161/6
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	47.7		ug/Kg		95	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	49.8		ug/Kg		100	52 - 140	2	20
1,1,2-Trichloroethane	50.0	50.2		ug/Kg		100	79 - 122	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406161/6
Matrix: Solid
Analysis Batch: 406161

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	49.7		ug/Kg		99	80 - 120	0	20
1,1-Dichloroethene	50.0	53.9		ug/Kg		108	71 - 126	1	20
1,2-Dichloroethane	50.0	44.0		ug/Kg		88	68 - 128	0	20
1,2-Dichloroethene, Total	100	114		ug/Kg		114	79 - 121	1	20
1,2-Dichloropropane	50.0	54.1		ug/Kg		108	80 - 126	0	20
2-Butanone (MEK)	50.0	46.6		ug/Kg		93	41 - 140	3	20
2-Hexanone	50.0	41.9		ug/Kg		84	63 - 136	4	20
4-Methyl-2-pentanone (MIBK)	50.0	42.7		ug/Kg		85	67 - 130	1	20
Acetone	50.0	38.0		ug/Kg		76	39 - 140	6	20
Benzene	50.0	51.9		ug/Kg		104	80 - 120	1	20
Bromodichloromethane	50.0	49.4		ug/Kg		99	78 - 124	0	20
Bromoform	50.0	48.8		ug/Kg		98	67 - 135	5	20
Bromomethane	50.0	40.6		ug/Kg		81	61 - 132	1	20
Carbon disulfide	50.0	53.8		ug/Kg		108	74 - 124	0	20
Carbon tetrachloride	50.0	47.2		ug/Kg		94	68 - 130	2	20
Chlorobenzene	50.0	50.9		ug/Kg		102	80 - 120	2	20
Chloroethane	50.0	33.6	o	ug/Kg		67	73 - 129	0	20
Chloroform	50.0	46.8		ug/Kg		94	78 - 120	0	20
Chloromethane	50.0	44.9		ug/Kg		90	69 - 123	3	20
cis-1,3-Dichloropropene	50.0	57.3		ug/Kg		115	78 - 127	1	20
Dibromochloromethane	50.0	49.4		ug/Kg		99	77 - 126	2	20
Ethylbenzene	50.0	49.9		ug/Kg		100	79 - 126	1	20
Methylene Chloride	50.0	55.8		ug/Kg		112	76 - 120	2	20
Styrene	50.0	56.7		ug/Kg		113	80 - 129	2	20
Tetrachloroethene	50.0	51.1		ug/Kg		102	76 - 126	1	20
Toluene	50.0	55.7		ug/Kg		111	76 - 136	2	20
trans-1,3-Dichloropropene	50.0	52.0		ug/Kg		104	77 - 136	1	20
Trichloroethene	50.0	49.8		ug/Kg		100	66 - 130	1	20
Vinyl chloride	50.0	39.5		ug/Kg		79	56 - 134	4	20
Xylenes, Total	100	112		ug/Kg		112	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*98*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-32124-2 MS
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3M431
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.44	U	55.3	52.6		ug/Kg	☼	95	80 - 120
1,1,2,2-Tetrachloroethane	2.0	U T	55.3	47.9		ug/Kg	☼	87	78 - 120
1,1,2-Trichloroethane	1.2	U	55.3	58.0		ug/Kg	☼	105	80 - 120
1,1-Dichloroethane	0.40	U	55.3	55.7		ug/Kg	☼	101	80 - 120
1,1-Dichloroethene	1.7	U	55.3	60.1		ug/Kg	☼	109	78 - 121
1,2-Dichloroethane	0.90	U	55.3	49.6		ug/Kg	☼	90	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32124-2 MS
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3M431
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.4	U	111	125		ug/Kg	☼	113	80 - 120
1,2-Dichloropropane	0.62	U	55.3	60.6		ug/Kg	☼	110	80 - 120
2-Butanone (MEK)	2.0	U	55.3	46.5		ug/Kg	☼	84	69 - 124
2-Hexanone	3.5	U	55.3	43.4		ug/Kg	☼	78	62 - 118
4-Methyl-2-pentanone (MIBK)	2.6	U	55.3	47.1		ug/Kg	☼	85	73 - 125
Acetone	6.7	U	55.3	56.1		ug/Kg	☼	102	54 - 139
Benzene	0.27	U	55.3	58.3		ug/Kg	☼	106	80 - 120
Bromodichloromethane	0.51	U	55.3	55.7		ug/Kg	☼	101	80 - 120
Bromoform	2.0	U	55.3	56.7		ug/Kg	☼	103	80 - 125
Bromomethane	2.4	U	55.3	46.1		ug/Kg	☼	83	70 - 126
Carbon disulfide	0.71	U	55.3	58.9		ug/Kg	☼	107	79 - 121
Carbon tetrachloride	0.53	U	55.3	52.9		ug/Kg	☼	96	80 - 120
Chlorobenzene	0.84	U	55.3	57.2		ug/Kg	☼	103	80 - 120
Chloroethane	2.0	U o	55.3	38.8		ug/Kg	☼	70	64 - 133
Chloroform	0.39	U	55.3	52.5		ug/Kg	☼	95	80 - 120
Chloromethane	0.67	U	55.3	49.7		ug/Kg	☼	90	75 - 120
cis-1,3-Dichloropropene	2.2	U	55.3	65.1		ug/Kg	☼	118	80 - 120
Dibromochloromethane	1.3	U	55.3	58.3		ug/Kg	☼	105	80 - 120
Ethylbenzene	0.71	U	55.3	54.9		ug/Kg	☼	99	80 - 120
Methylene Chloride	1.6	U	55.3	60.9		ug/Kg	☼	110	77 - 123
Styrene	2.0	U	55.3	61.7		ug/Kg	☼	112	80 - 120
Tetrachloroethene	0.58	U	55.3	55.9		ug/Kg	☼	101	80 - 120
Toluene	2.6	U	55.3	61.3		ug/Kg	☼	111	80 - 124
trans-1,3-Dichloropropene	1.8	U	55.3	58.2		ug/Kg	☼	105	80 - 122
Trichloroethene	0.40	U T	55.3	63.8		ug/Kg	☼	115	79 - 120
Vinyl chloride	0.44	U	55.3	44.5		ug/Kg	☼	80	71 - 120
Xylenes, Total	0.88	U	111	124		ug/Kg	☼	112	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*93*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Lab Sample ID: 160-32124-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3M431
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.44	U	65.0	63.0		ug/Kg	☼	97	80 - 120	18	20
1,1,2,2-Tetrachloroethane	2.0	U T	65.0	50.3	T	ug/Kg	☼	77	78 - 120	5	20
1,1,2-Trichloroethane	1.2	U	65.0	66.4		ug/Kg	☼	102	80 - 120	13	20
1,1-Dichloroethane	0.40	U	65.0	64.2		ug/Kg	☼	99	80 - 120	14	20
1,1-Dichloroethene	1.7	U	65.0	70.4		ug/Kg	☼	108	78 - 121	16	20
1,2-Dichloroethane	0.90	U	65.0	58.1		ug/Kg	☼	89	78 - 117	16	20
1,2-Dichloroethene, Total	1.4	U	130	148		ug/Kg	☼	114	80 - 120	17	20
1,2-Dichloropropane	0.62	U	65.0	69.7		ug/Kg	☼	107	80 - 120	14	20
2-Butanone (MEK)	2.0	U	65.0	54.7		ug/Kg	☼	84	69 - 124	16	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32124-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3M431
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.5	U	65.0	52.0		ug/Kg	☼	80	62 - 118	18	20
4-Methyl-2-pentanone (MIBK)	2.6	U	65.0	56.3		ug/Kg	☼	87	73 - 125	18	20
Acetone	6.7	U	65.0	62.2		ug/Kg	☼	96	54 - 139	10	20
Benzene	0.27	U	65.0	66.7		ug/Kg	☼	103	80 - 120	13	20
Bromodichloromethane	0.51	U	65.0	64.0		ug/Kg	☼	98	80 - 120	14	20
Bromoform	2.0	U	65.0	67.5		ug/Kg	☼	104	80 - 125	17	20
Bromomethane	2.4	U	65.0	53.3		ug/Kg	☼	82	70 - 126	15	20
Carbon disulfide	0.71	U	65.0	69.3		ug/Kg	☼	107	79 - 121	16	20
Carbon tetrachloride	0.53	U	65.0	61.2		ug/Kg	☼	94	80 - 120	15	20
Chlorobenzene	0.84	U	65.0	66.3		ug/Kg	☼	102	80 - 120	15	20
Chloroethane	2.0	U o	65.0	44.5		ug/Kg	☼	68	64 - 133	14	20
Chloroform	0.39	U	65.0	61.2		ug/Kg	☼	94	80 - 120	15	20
Chloromethane	0.67	U	65.0	57.5		ug/Kg	☼	88	75 - 120	15	20
cis-1,3-Dichloropropene	2.2	U	65.0	73.4		ug/Kg	☼	113	80 - 120	12	20
Dibromochloromethane	1.3	U	65.0	68.3		ug/Kg	☼	105	80 - 120	16	20
Ethylbenzene	0.71	U	65.0	64.4		ug/Kg	☼	99	80 - 120	16	20
Methylene Chloride	1.6	U	65.0	69.3		ug/Kg	☼	107	77 - 123	13	20
Styrene	2.0	U	65.0	72.8		ug/Kg	☼	112	80 - 120	16	20
Tetrachloroethene	0.58	U	65.0	63.3		ug/Kg	☼	97	80 - 120	12	20
Toluene	2.6	U	65.0	72.9		ug/Kg	☼	112	80 - 124	17	20
trans-1,3-Dichloropropene	1.8	U	65.0	68.8		ug/Kg	☼	106	80 - 122	17	20
Trichloroethene	0.40	U T	65.0	78.5	T y	ug/Kg	☼	121	79 - 120	21	20
Vinyl chloride	0.44	U	65.0	52.2		ug/Kg	☼	80	71 - 120	16	20
Xylenes, Total	0.88	U	130	143		ug/Kg	☼	110	80 - 120	14	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*90*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32124-1
SDG: SL32124-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32124-1	B3M423	92	99	96	99
160-32124-2	B3M431	91	100	92	98
160-32124-2 MS	B3M431	87	99	93	100
160-32124-2 MSD	B3M431	84	99	90	101
160-32124-3	B3M443	94	100	95	98
160-32124-4	B3M447	95	100	94	98
160-32124-5	B3M427	95	97	96	99
160-32124-6	B3M415	100	99	97	100
160-32124-7	B3M480	97	95	100	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406161/5	Lab Control Sample	86	96	96	99
LCSD 160-406161/6	Lab Control Sample Dup	84	96	98	100
MB 160-406161/8	Method Blank	87	96	98	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32124-1	B3M423	74	83	79	66	74	86
160-32124-1 MS	B3M423	82	85	79	75	75	91
160-32124-1 MSD	B3M423	86	87	84	76	76	86
160-32124-2	B3M431	73	83	82	67	73	85
160-32124-3	B3M443	80	86	82	69	77	89
160-32124-4	B3M447	74	85	84	69	75	84
160-32124-5	B3M427	77	82	84	68	78	82
160-32124-6	B3M415	75	87	82	70	73	84

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 160-406531/8
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.43	U	5.0	0.43	ug/Kg			12/19/18 11:26	1
1,1,2,2-Tetrachloroethane	2.0	U	5.0	2.0	ug/Kg			12/19/18 11:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.7	U	5.0	1.7	ug/Kg			12/19/18 11:26	1
1,1,2-Trichloroethane	1.2	U	5.0	1.2	ug/Kg			12/19/18 11:26	1
1,1-Dichloroethane	0.39	U	5.0	0.39	ug/Kg			12/19/18 11:26	1
1,1-Dichloroethene	1.6	U	5.0	1.6	ug/Kg			12/19/18 11:26	1
1,2-Dichloroethane	0.87	U	5.0	0.87	ug/Kg			12/19/18 11:26	1
1,2-Dichloroethene, Total	1.3	U	10	1.3	ug/Kg			12/19/18 11:26	1
1,2-Dichloropropane	0.60	U	5.0	0.60	ug/Kg			12/19/18 11:26	1
2-Butanone (MEK)	1.9	U	20	1.9	ug/Kg			12/19/18 11:26	1
2-Hexanone	3.4	U	20	3.4	ug/Kg			12/19/18 11:26	1
4-Methyl-2-pentanone (MIBK)	2.5	U	20	2.5	ug/Kg			12/19/18 11:26	1
Acetone	6.5	U	20	6.5	ug/Kg			12/19/18 11:26	1
Benzene	0.26	U	5.0	0.26	ug/Kg			12/19/18 11:26	1
Bromodichloromethane	0.50	U	5.0	0.50	ug/Kg			12/19/18 11:26	1
Bromoform	1.9	U	5.0	1.9	ug/Kg			12/19/18 11:26	1
Bromomethane	2.4	U	10	2.4	ug/Kg			12/19/18 11:26	1
Carbon disulfide	0.69	U	5.0	0.69	ug/Kg			12/19/18 11:26	1
Carbon tetrachloride	0.51	U	5.0	0.51	ug/Kg			12/19/18 11:26	1
Chlorobenzene	0.81	U	5.0	0.81	ug/Kg			12/19/18 11:26	1
Chloroethane	2.0	U	10	2.0	ug/Kg			12/19/18 11:26	1
Chloroform	0.38	U	5.0	0.38	ug/Kg			12/19/18 11:26	1
Chloromethane	0.65	U	10	0.65	ug/Kg			12/19/18 11:26	1
cis-1,3-Dichloropropene	2.1	U	5.0	2.1	ug/Kg			12/19/18 11:26	1
Dibromochloromethane	1.2	U	5.0	1.2	ug/Kg			12/19/18 11:26	1
Ethylbenzene	0.69	U	5.0	0.69	ug/Kg			12/19/18 11:26	1
Methylene Chloride	1.6	U	5.0	1.6	ug/Kg			12/19/18 11:26	1
Styrene	2.0	U	5.0	2.0	ug/Kg			12/19/18 11:26	1
Tetrachloroethene	0.56	U	5.0	0.56	ug/Kg			12/19/18 11:26	1
Toluene	2.5	U	5.0	2.5	ug/Kg			12/19/18 11:26	1
trans-1,3-Dichloropropene	1.7	U	5.0	1.7	ug/Kg			12/19/18 11:26	1
Trichloroethene	0.39	U	5.0	0.39	ug/Kg			12/19/18 11:26	1
Vinyl chloride	0.43	U	5.0	0.43	ug/Kg			12/19/18 11:26	1
Xylenes, Total	0.85	U	10	0.85	ug/Kg			12/19/18 11:26	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*					*12/19/18 11:26*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*67 - 132*		*12/19/18 11:26*	*1*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*		*12/19/18 11:26*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 143*		*12/19/18 11:26*	*1*
Toluene-d8 (Surr)	*105*		*74 - 135*		*12/19/18 11:26*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 160-406531/5
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	46.9		ug/Kg		94	71 - 127
1,1,2,2-Tetrachloroethane	50.0	61.4		ug/Kg		123	52 - 140
1,1,2-Trichloroethane	50.0	57.5		ug/Kg		115	79 - 122
1,1-Dichloroethane	50.0	48.6		ug/Kg		97	80 - 120
1,1-Dichloroethene	50.0	53.6		ug/Kg		107	71 - 126
1,2-Dichloroethane	50.0	48.7		ug/Kg		97	68 - 128
1,2-Dichloroethene, Total	100	110		ug/Kg		110	79 - 121
1,2-Dichloropropane	50.0	54.4		ug/Kg		109	80 - 126
2-Butanone (MEK)	50.0	59.9		ug/Kg		120	41 - 140
2-Hexanone	50.0	54.3		ug/Kg		109	63 - 136
4-Methyl-2-pentanone (MIBK)	50.0	53.1		ug/Kg		106	67 - 130
Acetone	50.0	50.5		ug/Kg		101	39 - 140
Benzene	50.0	51.6		ug/Kg		103	80 - 120
Bromodichloromethane	50.0	50.5		ug/Kg		101	78 - 124
Bromoform	50.0	58.0		ug/Kg		116	67 - 135
Bromomethane	50.0	40.8		ug/Kg		82	61 - 132
Carbon disulfide	50.0	50.8		ug/Kg		102	74 - 124
Carbon tetrachloride	50.0	46.9		ug/Kg		94	68 - 130
Chlorobenzene	50.0	52.6		ug/Kg		105	80 - 120
Chloroethane	50.0	32.8	o	ug/Kg		66	73 - 129
Chloroform	50.0	46.6		ug/Kg		93	78 - 120
Chloromethane	50.0	44.1		ug/Kg		88	69 - 123
cis-1,3-Dichloropropene	50.0	57.8		ug/Kg		116	78 - 127
Dibromochloromethane	50.0	54.4		ug/Kg		109	77 - 126
Ethylbenzene	50.0	49.5		ug/Kg		99	79 - 126
Methylene Chloride	50.0	55.5		ug/Kg		111	76 - 120
Styrene	50.0	56.2		ug/Kg		112	80 - 129
Tetrachloroethene	50.0	52.0		ug/Kg		104	76 - 126
Toluene	50.0	55.2		ug/Kg		110	76 - 136
trans-1,3-Dichloropropene	50.0	55.2		ug/Kg		110	77 - 136
Trichloroethene	50.0	50.3		ug/Kg		101	66 - 130
Vinyl chloride	50.0	40.2		ug/Kg		80	56 - 134
Xylenes, Total	100	110		ug/Kg		110	79 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*102*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: LCSD 160-406531/6
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	46.2		ug/Kg		92	71 - 127	1	20
1,1,2,2-Tetrachloroethane	50.0	55.5		ug/Kg		111	52 - 140	10	20
1,1,2-Trichloroethane	50.0	55.4		ug/Kg		111	79 - 122	4	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-406531/6
Matrix: Solid
Analysis Batch: 406531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	47.3		ug/Kg		95	80 - 120	3	20
1,1-Dichloroethene	50.0	52.3		ug/Kg		105	71 - 126	2	20
1,2-Dichloroethane	50.0	45.4		ug/Kg		91	68 - 128	7	20
1,2-Dichloroethene, Total	100	109		ug/Kg		109	79 - 121	1	20
1,2-Dichloropropane	50.0	52.1		ug/Kg		104	80 - 126	4	20
2-Butanone (MEK)	50.0	52.1		ug/Kg		104	41 - 140	14	20
2-Hexanone	50.0	49.1		ug/Kg		98	63 - 136	10	20
4-Methyl-2-pentanone (MIBK)	50.0	47.9		ug/Kg		96	67 - 130	10	20
Acetone	50.0	42.8		ug/Kg		86	39 - 140	16	20
Benzene	50.0	50.7		ug/Kg		101	80 - 120	2	20
Bromodichloromethane	50.0	48.7		ug/Kg		97	78 - 124	4	20
Bromoform	50.0	51.1		ug/Kg		102	67 - 135	13	20
Bromomethane	50.0	38.6		ug/Kg		77	61 - 132	6	20
Carbon disulfide	50.0	49.8		ug/Kg		100	74 - 124	2	20
Carbon tetrachloride	50.0	45.6		ug/Kg		91	68 - 130	3	20
Chlorobenzene	50.0	51.6		ug/Kg		103	80 - 120	2	20
Chloroethane	50.0	32.6	o	ug/Kg		65	73 - 129	1	20
Chloroform	50.0	45.8		ug/Kg		92	78 - 120	2	20
Chloromethane	50.0	42.8		ug/Kg		86	69 - 123	3	20
cis-1,3-Dichloropropene	50.0	56.4		ug/Kg		113	78 - 127	2	20
Dibromochloromethane	50.0	52.5		ug/Kg		105	77 - 126	4	20
Ethylbenzene	50.0	50.7		ug/Kg		101	79 - 126	2	20
Methylene Chloride	50.0	53.0		ug/Kg		106	76 - 120	5	20
Styrene	50.0	57.1		ug/Kg		114	80 - 129	2	20
Tetrachloroethene	50.0	52.3		ug/Kg		105	76 - 126	1	20
Toluene	50.0	55.7		ug/Kg		111	76 - 136	1	20
trans-1,3-Dichloropropene	50.0	54.4		ug/Kg		109	77 - 136	1	20
Trichloroethene	50.0	49.8		ug/Kg		100	66 - 130	1	20
Vinyl chloride	50.0	39.6		ug/Kg		79	56 - 134	1	20
Xylenes, Total	100	113		ug/Kg		113	79 - 132	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*67 - 132*
4-Bromofluorobenzene (Surr)	*102*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Lab Sample ID: 160-32192-2 MS
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.53	U	51.2	49.8		ug/Kg	☼	97	80 - 120
1,1,2,2-Tetrachloroethane	2.4	U	51.2	50.5		ug/Kg	☼	98	78 - 120
1,1,2-Trichloroethane	1.5	U	51.2	56.1		ug/Kg	☼	110	80 - 120
1,1-Dichloroethane	0.48	U	51.2	52.2		ug/Kg	☼	102	80 - 120
1,1-Dichloroethene	2.0	U	51.2	54.8		ug/Kg	☼	107	78 - 121
1,2-Dichloroethane	1.1	U	51.2	47.5		ug/Kg	☼	93	78 - 117

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32192-2 MS
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethene, Total	1.7	U	102	118		ug/Kg	☼	115	80 - 120
1,2-Dichloropropane	0.75	U	51.2	55.9		ug/Kg	☼	109	80 - 120
2-Butanone (MEK)	2.4	U	51.2	48.2		ug/Kg	☼	94	69 - 124
2-Hexanone	4.2	U	51.2	47.3		ug/Kg	☼	92	62 - 118
4-Methyl-2-pentanone (MIBK)	3.1	U	51.2	44.4		ug/Kg	☼	87	73 - 125
Acetone	8.0	U	51.2	43.3		ug/Kg	☼	84	54 - 139
Benzene	0.32	U	51.2	54.1		ug/Kg	☼	106	80 - 120
Bromodichloromethane	0.61	U	51.2	53.8		ug/Kg	☼	105	80 - 120
Bromoform	2.4	U	51.2	55.5		ug/Kg	☼	108	80 - 125
Bromomethane	2.9	U	51.2	42.4		ug/Kg	☼	83	70 - 126
Carbon disulfide	0.85	U	51.2	51.3		ug/Kg	☼	100	79 - 121
Carbon tetrachloride	0.63	U	51.2	48.5		ug/Kg	☼	95	80 - 120
Chlorobenzene	1.0	U	51.2	53.7		ug/Kg	☼	105	80 - 120
Chloroethane	2.4	U o	51.2	35.1		ug/Kg	☼	68	64 - 133
Chloroform	0.47	U	51.2	49.7		ug/Kg	☼	97	80 - 120
Chloromethane	0.80	U	51.2	44.5		ug/Kg	☼	87	75 - 120
cis-1,3-Dichloropropene	2.6	U	51.2	57.9		ug/Kg	☼	113	80 - 120
Dibromochloromethane	1.5	U	51.2	54.9		ug/Kg	☼	107	80 - 120
Ethylbenzene	0.85	U	51.2	52.3		ug/Kg	☼	102	80 - 120
Methylene Chloride	2.0	U	51.2	55.5		ug/Kg	☼	108	77 - 123
Styrene	2.4	U	51.2	58.8		ug/Kg	☼	115	80 - 120
Tetrachloroethene	0.70	U	51.2	51.9		ug/Kg	☼	101	80 - 120
Toluene	3.1	U	51.2	58.4		ug/Kg	☼	114	80 - 124
trans-1,3-Dichloropropene	2.2	U	51.2	53.5		ug/Kg	☼	104	80 - 122
Trichloroethene	0.48	U	51.2	56.3		ug/Kg	☼	110	79 - 120
Vinyl chloride	0.53	U	51.2	40.7		ug/Kg	☼	79	71 - 120
Xylenes, Total	1.1	U	102	115		ug/Kg	☼	112	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Lab Sample ID: 160-32192-2 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.53	U	55.8	52.4		ug/Kg	☼	94	80 - 120	5	20
1,1,2,2-Tetrachloroethane	2.4	U	55.8	54.3		ug/Kg	☼	97	78 - 120	7	20
1,1,2-Trichloroethane	1.5	U	55.8	59.3		ug/Kg	☼	106	80 - 120	5	20
1,1-Dichloroethane	0.48	U	55.8	55.2		ug/Kg	☼	99	80 - 120	6	20
1,1-Dichloroethene	2.0	U	55.8	59.1		ug/Kg	☼	106	78 - 121	8	20
1,2-Dichloroethane	1.1	U	55.8	50.4		ug/Kg	☼	90	78 - 117	6	20
1,2-Dichloroethene, Total	1.7	U	112	124		ug/Kg	☼	111	80 - 120	5	20
1,2-Dichloropropane	0.75	U	55.8	60.9		ug/Kg	☼	109	80 - 120	9	20
2-Butanone (MEK)	2.4	U	55.8	51.5		ug/Kg	☼	92	69 - 124	7	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32192-2 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.2	U	55.8	50.1		ug/Kg	☼	90	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	3.1	U	55.8	48.9		ug/Kg	☼	88	73 - 125	10	20
Acetone	8.0	U	55.8	45.0		ug/Kg	☼	81	54 - 139	4	20
Benzene	0.32	U	55.8	58.9		ug/Kg	☼	105	80 - 120	8	20
Bromodichloromethane	0.61	U	55.8	55.7		ug/Kg	☼	100	80 - 120	3	20
Bromoform	2.4	U	55.8	58.7		ug/Kg	☼	105	80 - 125	6	20
Bromomethane	2.9	U	55.8	46.5		ug/Kg	☼	83	70 - 126	9	20
Carbon disulfide	0.85	U	55.8	54.7		ug/Kg	☼	98	79 - 121	6	20
Carbon tetrachloride	0.63	U	55.8	52.5		ug/Kg	☼	94	80 - 120	8	20
Chlorobenzene	1.0	U	55.8	57.2		ug/Kg	☼	102	80 - 120	6	20
Chloroethane	2.4	U o	55.8	37.9		ug/Kg	☼	68	64 - 133	8	20
Chloroform	0.47	U	55.8	53.1		ug/Kg	☼	95	80 - 120	7	20
Chloromethane	0.80	U	55.8	48.6		ug/Kg	☼	87	75 - 120	9	20
cis-1,3-Dichloropropene	2.6	U	55.8	61.5		ug/Kg	☼	110	80 - 120	6	20
Dibromochloromethane	1.5	U	55.8	57.2		ug/Kg	☼	102	80 - 120	4	20
Ethylbenzene	0.85	U	55.8	56.1		ug/Kg	☼	101	80 - 120	7	20
Methylene Chloride	2.0	U	55.8	61.3		ug/Kg	☼	110	77 - 123	10	20
Styrene	2.4	U	55.8	62.6		ug/Kg	☼	112	80 - 120	6	20
Tetrachloroethene	0.70	U	55.8	55.5		ug/Kg	☼	99	80 - 120	7	20
Toluene	3.1	U	55.8	61.8		ug/Kg	☼	111	80 - 124	6	20
trans-1,3-Dichloropropene	2.2	U	55.8	56.1		ug/Kg	☼	100	80 - 122	5	20
Trichloroethene	0.48	U	55.8	60.4		ug/Kg	☼	108	79 - 120	7	20
Vinyl chloride	0.53	U	55.8	43.7		ug/Kg	☼	78	71 - 120	7	20
Xylenes, Total	1.1	U	112	125		ug/Kg	☼	112	80 - 120	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*67 - 132*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32192-2	B3MMR4	97	99	105	104
160-32192-2 MS	B3MMR4	94	101	100	104
160-32192-2 MSD	B3MMR4	91	103	101	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406531/5	Lab Control Sample	98	101	102	106
LCSD 160-406531/6	Lab Control Sample Dup	93	102	101	106
MB 160-406531/8	Method Blank	95	103	103	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32192-2	B3MMR4	77	76	76	62	73	80
160-32192-2 MS	B3MMR4	78	81	83	74	76	87
160-32192-2 MSD	B3MMR4	82	83	87	75	78	89

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) SL31919-1. SL32018-1, SL32078-1, SL32124-1, SL32192-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3MMP6	11/15/18	Soil	C	8270D
B3MMR0	11/26/18	Soil	C	8270D
B3M451	11/29/18	Soil	C	8270D
B3M463	11/29/18	Soil	C	8270D
B3M459	11/29/18	Soil	C	8270D
B3M471	11/29/18	Soil	C	8270D
B3M439	11/29/18	Soil	C	8270D
B3M467	11/29/18	Soil	C	8270D
B3M419	11/29/18	Soil	C	8270D
B3M455	11/29/18	Soil	C	8270D
B3M435	11/29/18	Soil	C	8270D
B3M423	12/03/18	Soil	C	8270D
B3M431	12/03/18	Soil	C	8270D
B3M443	12/03/18	Soil	C	8270D
B3M447	12/03/18	Soil	C	8270D
B3M427	12/03/18	Soil	C	8270D
B3M415	12/03/18	Soil	C	8270D
B3MMR4	12/06/18	Soil	C	8270D

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for semivolatile organics in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the 2,4,6-tribromophenol and nitrobenzene-d5 surrogate recoveries for sample B3MMP6 and the MB were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries for sample B3MMP6 and the MB were within the acceptance limit, therefore based on professional judgment; data should not be qualified as a result.

For SDG SL32018-1, the 2,4,6-tribromopheneol and nitrobenzene-d5 surrogate recoveries for sample B3MMR0 and the 2,4,6-tribromphenol surrogate recovery for the MB were below the lower acceptance limit but ≥20%. All other associated surrogate recoveries for sample B3MMR0 and the MB were within the acceptance limit, therefore based on professional judgment, data should not be qualified as a result.

For SDG SL32078-1, the nitrobenzene-d5 surrogate recoveries for samples B3M451, B3M451MSD, B3M463, B3M459, B3M471, B3M439, B3M467 and B3M419 and the 2,4,6-tribromophenol and nitrobenzene-d5 for samples B3M455 were below the lower acceptance limit but ≥20%. All other associated surrogates recoveries were within the acceptance limit, therefore based on professional judgment data should not be qualified as a result. The 2,4,6-tribromophenol, nitrobenzene-d5 and phenol-d6 surrogate recoveries for sample B3M435 and the MB were below the lower acceptance limit but ≥20%. Sample B3M435 was analyzed at a dilution and the MB was a QC sample, data should not be qualified as a result.

For SDG SL32124-1, the nitrobenzene-d5 surrogate recoveries for samples B3M423, B3M431, B3M443, B3M447 and B3M427 were below the lower acceptance limit but ≥20%. All other surrogate recoveries were within the acceptance limit, therefore, based on professional judgment data should not be qualified. The 2,4,6-tribromphenol, nitrobenzene-d4 and phenol-d6 surrogates recoveries for the MB were below the lower acceptance limit but ≥20%. Since the sample was a QC sample, data should not be qualified as a result.

For SDG SL32192-1, the nitrobenzene-d5 surrogate recoveries for sample B3MMR4 and the MB were below the lower acceptance limit but >20%. All other surrogate recoveries were within the acceptance limit, therefore based on professional judgment, data should not be qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the MS and/or MSD recoveries for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane and pentachlorophenol were below the lower acceptance limit but ≥20%. All associated results for sample B3MMP6 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32018-1, the MS and/or MSD recoveries for 3,3'-dichlorobenzidine, 4-chloroaniline, 2,4-dinitrophenol and bis(2-chloroethyl)ether were below the lower acceptance limit but ≥20%. All associated results for sample B3MMR0 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32078-1, the MS and/or MSD recoveries for 1,3-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, dibenz(a,h)anthracene,

hexachlorocyclopentadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, isophorone, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene and nitrobenzene were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32124-1, the MS and/or MSD recoveries for 2,4-dinitrophenol, 4-chloroaniline, bis(2-chloroethyl)ether, isophorone, 3,3'-dichlorobenzidine and bis(2 chloro-1-methylethyl)ether were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the MS and/or MSD recoveries for 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2-chloroethyl)ether, hexachloroethane and isophorone were below the lower acceptance limit but ≥20%. All associated results for sample B3MMR4 were non-detects and should be qualified as estimates and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the LCS recoveries for 3,3'-dichlorobenzidine and 4-chloroaniline were below the lower acceptance limit but ≥40%. The 3,3'-dichlorobenzidine and 4-chloroaniline results for sample B3MMP6 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32018-1, the LCS recoveries for 4-chloroaniline and hexachlorocyclopentadiene were below the lower acceptance limit but ≥40%. The 4-chloroaniline and hexachlorocyclopentadiene results for sample B3MMR0 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32078-1, the LCS recoveries for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorocyclopentadiene, hexachloroethane and isophorone were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32124-1, the LCS recoveries for 3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachloroethane, isophorone and phenol were below the lower acceptance limit but ≥40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the LCS recoveries for 4-chloroaniline, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether and isophorone were below the lower acceptance limit but ≥40%. All associated results for sample B3MMR4 were non-detects and should be qualified as estimates and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for SVOCs were not provided in the SAP.

- **Completeness**

SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low matrix spike recoveries and low LCS recoveries. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, hexachloroethane, pentachlorophenol	UJ	B3MMP6	Low matrix spike recoveries
3,3'-dichlorobenzidine, 4-chloroaniline	UJ	B3MMP6	Low matrix spike recoveries and low LCS recoveries
3,3'-dichlorobenzidine, 2,4-dinitrophenol, bis(2-chloroethyl)ether	UJ	B3MMR0	Low matrix spike recoveries
4-chloroaniline	UJ	B3MMR0	Low matrix spike recoveries and low LCS recovery
hexachlorocyclopentadiene	UJ	B3MMR0	Low LCS recovery
bis(2-chloroethoxy)methane, indeno(1,2,3-cd)pyrene, nitrobenzene	UJ	B3M451, B3M463, B3M459, B3M471, B3M439, B3M467, B3M419, B3M455, B3M435	Low matrix spike recoveries
1,3-dichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo(g,h,i)perylene, bis(2 chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, dibenz(a,h)anthracene,	UJ	B3M451, B3M463, B3M459, B3M471, B3M439, B3M467, B3M419, B3M455, B3M435	Low matrix spike recoveries and low LCS recoveries

hexachlorocyclopentadiene, hexachloroethane, isophorone			
2,4-dinitrophenol	UJ	B3M423, B3M431, B3M443, B3M447, B3M427, B3M415	Low matrix spike recoveries
3,3'-dichlorobenzidine, 4-chloroaniline, bis(2 chloro-1-methylethyl)ether bis(2-chloroethyl)ether, isophorone	UJ	B3M423, B3M431, B3M443, B3M447, B3M427, B3M415	Low matrix spike recoveries and low LCS recoveries
Hexachloroethane, phenol	UJ	B3M423, B3M431, B3M443, B3M447, B3M427, B3M415	Low LCS recoveries
3,3'-dichlorobenzidine, hexachloroethane	UJ	B3MMR4	Low matrix spike recoveries
4-chloroaniline, bis(2-chloroethyl)ether, isophorone	UJ	B3MMR4	Low matrix spike recoveries and low LCS recoveries
bis(2 chloro-1-methylethyl)ether	UJ	B3MMR4	Low LCS recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-016		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
SDG SL31919-1: B3MMP6					
SDG SL32018-1: B3MMR0					
SDG SL32078-1: B3M451, B3M463, B3M459, B3M471, B3M439, B3M467, B3M419, B3M455, B3M435					
SDG SL32124-1: B3M423, B3M431, B3M443, B3M447, B3M427, B3M415,					
SDG SL32192-1: B3MMR4					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogates

SL31919-1- B3MMP6 TBP 60%, NBZ 66%, MB TPB 69%, NBZ 69%

SL32018-1- B3MMR0 TBP 67%, NBZ 65%; MB TBP 68%

SL32078-1 - B3M451 NBZ 65%, B3M451MSD NBZ 67%, B3M463 NBZ 67%, B3M459 NBZ 64%, B3M455 TBP 67%, NBZ 59%; B3M435 TBP 67%, NBZ 59%, PHL 69%, B3M471 NBZ 64%, B3M439 NBZ 62%, B3M467 NBZ 61%, B3M419 NBZ 62%, MB TBP 67%, NBZ 63%, PHL 69%

SL32124-1 - B3M423 NBZ 66%, B3M431 NBZ 67%, B3M443 NBZ 69%, B3M447 NBZ 69%, B3M427 NBZ 69%, MB TBP 61%, NBZ 60%, PHL 64%

SL32192-1 - B3MMR4 NBZ 62%, MB NBZ 67%

SEE LAST PAGE FOR MS/MSD AND LCS INFO

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes No N/A
MS/MSD RPD values acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No N/A
Internal standard areas acceptable?	Yes No N/A
Internal standard retention times acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix A - (Cont.) Chemical Data Validation Checklist

MS/MSD

SL31919-1 - 1,2-dichlorobenzene 69% (MS), 1,3-dichlorobenzene 66% (MS), 1,4-dichlorobenzene 69%/68%, 2,4-dinitrophenol 62%/54%, 3,3'-dichlorobenzidine 61%/67%, 4-chloroaniline 57%/56%, bis(2-chloro-1-methylethyl)ether 69%/67%, bis(2-chloroethyl)ether 67% (MSD), hexachlorocyclopentadiene 64%61%, hexachloroethane 68%/68%, pentachlorophenol 68%

SL32018-1 - 3,3'-dichlorobenzidine 69%/68%, 4-chloroaniline 65%/60%, 2,4-dinitrophenol 69% (MSD), bis(2-chloroethyl)ether 69%

SL32078-1 - 1,3-dichlorobenzene 69%/66%, 2,4-dinitrophenol 65%/63%, 3,3'-dichlorobenzidine 66%/64%, 4-chloroaniline 64%/58%, benzo(g,h,i)perylene 57%/53%, bis(2-chloro-1-methylethyl)ether 64% (MSD), bis(2-chloroethoxy)methane 69% (MSD), bis(2-chloroethyl)ether 61% (MSD), dibenz(a,h)anthracene 64% (MSD), hexachlorocyclopentadiene 64%/64%, hexachloroethane 63% (MSD), indeno(1,2,3-cd)pyrene 69%/64%, isophorone 67%/64%, 1,2,4-trichlorobenzene 69% (MSD), 1,2-dichlorobenzene 67% (MSD), 1,4-dichlorobenzene 67% (MSD), nitrobenzene 68% (MSD)

SL32124-1 - 2,4-dinitrophenol 67% (MS), 4-chloroaniline 62%/66%, bis(2-chloroethyl)ether 65%/66%, isophorone 68%/69%, 3,3'-dichlorobenzidine 69% (MSD), bis(2-chloro-1-methylethyl)ether 68% (MSD),

SL32192-1 - 3,3'-dichlorobenzidine 67%/66%, 4-chloroaniline 62%/65%, bis(2-chloroethyl)ether 66%/65%, hexachloroethane 67% (MS), isophorone 67%/69%

LCS

SL31919-1 - 3,3'-dichlorobenzidine 66%, 4-chloroaniline 65%,

SL32018-1 - 4-chloroaniline 66%, hexachlorocyclopentadiene 69%,

SL32078-1 - 1,2,4-trichlorobenzene 69%, 1,2-dichlorobenzene 68%, 1,3-dichlorobenzene 65%, 1,4-dichlorobenzene 68%, 2,4-dinitrophenol 68%, 3,3'-dichlorobenzidine 64%, 4-chloroaniline 60%, benzo(g,h,i)perylene 52%, bis(2-chloro-1-methylethyl)ether 69%, bis(2-chloroethyl)ether 62%, dibenz(a,h)anthracene 62%, hexachlorocyclopentadiene 65%, hexachloroethane 68%, isophorone 67%,

SL32124-1 - 3,3'-dichlorobenzidine 67%, 4-chloroaniline 59%, bis(2-chloro-1-methylethyl)ether 65%, bis(2-chloroethyl)ether 61%, hexachloroethane 68%, isophorone 65%, phenol 69%

SL32192-1 - 4-chloroaniline 64%, bis(2-chloro-1-methylethyl)ether 69%, bis(2-chloroethyl)ether 66%, isophorone 68%

Appendix 4

Additional Documentation Requested By Client

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31915-E-2-A MSD
Matrix: Solid
Analysis Batch: 405466

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 405471

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.1	U	47.6	36.6		ug/Kg	☼	77	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	3.1	U	47.6	43.1		ug/Kg	☼	90	73 - 125	1	20
Acetone	7.8	U	47.6	54.0		ug/Kg	☼	113	54 - 139	7	20
Benzene	0.31	U	47.6	48.9		ug/Kg	☼	103	80 - 120	0	20
Bromodichloromethane	0.60	U	47.6	50.1		ug/Kg	☼	105	80 - 120	2	20
Bromoform	2.3	U	47.6	50.2		ug/Kg	☼	105	80 - 125	1	20
Bromomethane	2.9	U	47.6	48.0		ug/Kg	☼	101	70 - 126	2	20
Carbon disulfide	0.83	U T	47.6	47.9	y	ug/Kg	☼	101	79 - 121	31	20
Carbon tetrachloride	0.62	U	47.6	48.8		ug/Kg	☼	103	80 - 120	2	20
Chlorobenzene	0.98	U	47.6	47.9		ug/Kg	☼	101	80 - 120	3	20
Chloroethane	2.4	U	47.6	44.4		ug/Kg	☼	93	64 - 133	10	20
Chloroform	0.46	U	47.6	47.4		ug/Kg	☼	99	80 - 120	4	20
Chloromethane	0.79	U	47.6	56.9		ug/Kg	☼	120	75 - 120	1	20
cis-1,3-Dichloropropene	2.6	U	47.6	52.7		ug/Kg	☼	111	80 - 120	3	20
Dibromochloromethane	1.5	U	47.6	49.7		ug/Kg	☼	104	80 - 120	2	20
Ethylbenzene	0.83	U	47.6	47.7		ug/Kg	☼	100	80 - 120	3	20
Methylene Chloride	1.9	U	47.6	50.2		ug/Kg	☼	105	77 - 123	0	20
Styrene	2.4	U	47.6	51.9		ug/Kg	☼	109	80 - 120	2	20
Tetrachloroethene	0.68	U	47.6	46.4		ug/Kg	☼	97	80 - 120	3	20
Toluene	3.0	U	47.6	52.4		ug/Kg	☼	110	80 - 124	2	20
trans-1,3-Dichloropropene	2.1	U	47.6	50.9		ug/Kg	☼	107	80 - 122	3	20
Trichloroethene	0.47	U	47.6	51.2		ug/Kg	☼	108	79 - 120	0	20
Vinyl chloride	0.52	U	47.6	51.4		ug/Kg	☼	108	71 - 120	1	20
Xylenes, Total	1.0	U	95.3	104		ug/Kg	☼	109	80 - 120	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*67 - 132*
4-Bromofluorobenzene (Surr)	*104*		*59 - 150*
Dibromofluoromethane (Surr)	*100*		*53 - 143*
Toluene-d8 (Surr)	*104*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
2-Picoline	45	U	660	45	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acenaphthene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acenaphthylene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Acetophenone	34	U	330	34	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Aniline	60	U	330	60	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Anthracene	49	U	330	49	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Aramite	330	U	660	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbazole	47	U	330	47	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Chrysene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diallate	67	U	660	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dibenzofuran	41	U	330	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diethylphthalate	82	U	330	82	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dimethoate	100	U	660	100	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Dinoseb	330	U	660	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Disulfoton	41	U	1600	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Famphur	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Fluoranthene	50	U	330	50	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Fluorene	46	U	330	46	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachloroethane	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isodrin	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isophorone	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Isosafrole	67	U	660	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Kepone	330	U	3300	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methapyrilene	140	U	1600	140	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Methyl parathion	120	U	1600	120	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Naphthalene	35	U	330	35	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Nitrobenzene	40	U	330	40	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
o-Toluidine	51	U	330	51	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Parathion	98	U	1600	98	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-402691/1-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenacetin	54	U	660	54	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenanthrene	42	U	330	42	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phenol	38	U	330	38	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Phorate	37	U	1600	37	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pronamide	53	U	660	53	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pyrene	73	U	330	73	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Pyridine	71	U	660	71	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Safrole	33	U	660	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/26/18 15:48	12/04/18 14:04	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/26/18 15:48	12/04/18 14:04	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*548*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*9730*	*N*	*ug/Kg*		*4.60*		*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*705*	*N*	*ug/Kg*		*5.14*		*11/26/18 15:48*	*12/04/18 14:04*	*1*
n-Hexadecanoic acid	*267*	*N J*	*ug/Kg*		*10.98*	*57-10-3*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Unknown	*214*	*N*	*ug/Kg*		*13.88*		*11/26/18 15:48*	*12/04/18 14:04*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*69*		*47 - 125*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
2-Fluorobiphenyl (Surr)	*79*		*59 - 110*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
2-Fluorophenol (Surr)	*79*		*54 - 102*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Nitrobenzene-d5 (Surr)	*69*		*44 - 120*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Phenol-d5 (Surr)	*78*		*51 - 104*	*11/26/18 15:48*	*12/04/18 14:04*	*1*
Terphenyl-d14 (Surr)	*87*		*59 - 98*	*11/26/18 15:48*	*12/04/18 14:04*	*1*

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2480		ug/Kg		74	58 - 101
1,2-Dichlorobenzene	3330	2440		ug/Kg		73	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2450		ug/Kg		73	56 - 98
2,4,5-Trichlorophenol	3330	2720		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2800		ug/Kg		84	56 - 110
2,4-Dichlorophenol	3330	2750		ug/Kg		83	57 - 99
2,4-Dimethylphenol	3330	2660		ug/Kg		80	53 - 97
2,4-Dinitrophenol	3330	2420		ug/Kg		73	10 - 89

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dinitrotoluene	3330	2770		ug/Kg		83	54 - 105
2,6-Dinitrotoluene	3330	2600		ug/Kg		78	55 - 105
2-Chloronaphthalene	3330	2750		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2700		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2730		ug/Kg		82	58 - 98
2-Methylphenol	3330	2630		ug/Kg		79	53 - 97
2-Nitroaniline	3330	2540		ug/Kg		76	55 - 108
2-Nitrophenol	3330	2650		ug/Kg		79	59 - 104
3 & 4 Methylphenol	3330	3060		ug/Kg		92	58 - 108
3,3'-Dichlorobenzidine	3330	2210		ug/Kg		66	42 - 104
3-Nitroaniline	3330	2440		ug/Kg		73	43 - 96
4,6-Dinitro-2-methylphenol	3330	2970		ug/Kg		89	19 - 102
4-Bromophenyl phenyl ether	3330	2760		ug/Kg		83	58 - 109
4-Chloro-3-methylphenol	3330	2710		ug/Kg		81	54 - 98
4-Chloroaniline	3330	2160		ug/Kg		65	41 - 83
4-Chlorophenyl phenyl ether	3330	2770		ug/Kg		83	55 - 105
4-Nitroaniline	3330	2750		ug/Kg		82	49 - 99
4-Nitrophenol	3330	2650		ug/Kg		79	48 - 106
Acenaphthene	3330	2790		ug/Kg		84	55 - 106
Acenaphthylene	3330	2730		ug/Kg		82	56 - 109
Anthracene	3330	2820		ug/Kg		85	56 - 103
Benzo[a]anthracene	3330	2730		ug/Kg		82	56 - 107
Benzo[a]pyrene	3330	2720		ug/Kg		82	57 - 109
Benzo[b]fluoranthene	3330	2700		ug/Kg		81	68 - 109
Benzo[g,h,i]perylene	3330	2500		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2700		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2340		ug/Kg		70	49 - 94
Bis(2-chloroethoxy)methane	3330	2710		ug/Kg		81	56 - 99
Bis(2-chloroethyl)ether	3330	2380		ug/Kg		72	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2770		ug/Kg		83	59 - 113
Butyl benzyl phthalate	3330	2710		ug/Kg		81	60 - 112
Carbazole	3330	2870		ug/Kg		86	53 - 98
Chrysene	3330	2740		ug/Kg		82	54 - 107
Dibenz(a,h)anthracene	3330	2540		ug/Kg		76	52 - 126
Dibenzofuran	3330	2750		ug/Kg		83	55 - 103
Diethylphthalate	3330	2790		ug/Kg		84	54 - 101
Di-n-butyl phthalate	3330	2830		ug/Kg		85	57 - 102
Di-n-octyl phthalate	3330	2930		ug/Kg		88	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3330		ug/Kg		100	63 - 121
Fluoranthene	3330	2820		ug/Kg		85	54 - 100
Fluorene	3330	2840		ug/Kg		85	57 - 106
Hexachlorobenzene	3330	2860		ug/Kg		86	57 - 109
Hexachlorobutadiene	3330	2680		ug/Kg		80	59 - 106
Hexachlorocyclopentadiene	3330	2570		ug/Kg		77	44 - 140
Hexachloroethane	3330	2380		ug/Kg		71	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2600		ug/Kg		78	52 - 132
Isophorone	3330	2510		ug/Kg		75	55 - 96

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-402691/2-A
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	3330	2650		ug/Kg		79	57 - 98
Nitrobenzene	3330	2670		ug/Kg		80	58 - 102
N-Nitrosodi-n-propylamine	3330	2690		ug/Kg		81	54 - 98
Pentachlorophenol	3330	2660		ug/Kg		80	35 - 107
Phenanthrene	3330	2850		ug/Kg		86	57 - 103
Phenol	3330	2710		ug/Kg		81	50 - 96
Pyrene	3330	2730		ug/Kg		82	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*82*		*51 - 104*
Terphenyl-d14 (Surr)	*80*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL

Lab Sample ID: 160-31915-A-1-B MS
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene - DL	170	U D	3420	2460	D	ug/Kg	☼	72	52 - 103
1,2-Dichlorobenzene - DL	180	U D	3420	2340	D	ug/Kg	☼	69	50 - 98
1,3-Dichlorobenzene - DL	190	U D	3420	2270	D	ug/Kg	☼	66	49 - 96
1,4-Dichlorobenzene - DL	190	U D	3420	2360	D	ug/Kg	☼	69	50 - 96
2,4,5-Trichlorophenol - DL	270	U D	3420	2660	D	ug/Kg	☼	78	41 - 116
2,4,6-Trichlorophenol - DL	230	U D	3420	2690	D	ug/Kg	☼	79	40 - 115
2,4-Dichlorophenol - DL	200	U D	3420	2810	D	ug/Kg	☼	82	47 - 104
2,4-Dimethylphenol - DL	280	U D	3420	2470	D	ug/Kg	☼	72	45 - 105
2,4-Dinitrophenol - DL	1700	U D	3420	2130	J D	ug/Kg	☼	62	10 - 100
2,4-Dinitrotoluene - DL	640	U D	3420	2720	D	ug/Kg	☼	80	42 - 113
2,6-Dinitrotoluene - DL	320	U D	3420	2520	D	ug/Kg	☼	74	46 - 109
2-Chloronaphthalene - DL	190	U D	3420	2720	D	ug/Kg	☼	80	52 - 108
2-Chlorophenol - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 102
2-Methylnaphthalene - DL	210	U D	3420	2610	D	ug/Kg	☼	76	55 - 97
2-Methylphenol - DL	220	U D	3420	2500	D	ug/Kg	☼	73	46 - 98
2-Nitroaniline - DL	610	U D	3420	2720	D	ug/Kg	☼	80	45 - 111
2-Nitrophenol - DL	740	U D	3420	2380	D	ug/Kg	☼	70	38 - 115
3 & 4 Methylphenol - DL	340	U D	3420	3010	J D	ug/Kg	☼	88	48 - 111
3,3'-Dichlorobenzidine - DL	580	U D	3420	2070	J D	ug/Kg	☼	61	23 - 102
3-Nitroaniline - DL	520	U D	3420	2470	D	ug/Kg	☼	72	32 - 95
4,6-Dinitro-2-methylphenol - DL	1700	U D	3420	2610	J D	ug/Kg	☼	76	15 - 118
4-Bromophenyl phenyl ether - DL	250	U D	3420	2670	D	ug/Kg	☼	78	53 - 110
4-Chloro-3-methylphenol - DL	220	U D	3420	2700	D	ug/Kg	☼	79	36 - 111
4-Chloroaniline - DL	240	U D	3420	1930	D	ug/Kg	☼	57	32 - 79
4-Chlorophenyl phenyl ether - DL	220	U D	3420	2630	D	ug/Kg	☼	77	51 - 103

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-A-1-B MS
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitroaniline - DL	380	U D	3420	2780	J D	ug/Kg	☼	81	36 - 102
4-Nitrophenol - DL	1700	U D	3420	2650	J D	ug/Kg	☼	78	40 - 113
Acenaphthene - DL	180	U D	3420	2670	D	ug/Kg	☼	78	53 - 105
Acenaphthylene - DL	230	U D	3420	2590	D	ug/Kg	☼	76	55 - 107
Anthracene - DL	250	U D	3420	2660	D	ug/Kg	☼	78	55 - 103
Benzo[a]anthracene - DL	300	U D	3420	2720	D	ug/Kg	☼	80	48 - 112
Benzo[a]pyrene - DL	460	U D	3420	2750	D	ug/Kg	☼	81	46 - 117
Benzo[b]fluoranthene - DL	170	U D	3420	2710	D	ug/Kg	☼	79	45 - 125
Benzo[g,h,i]perylene - DL	170	U D	3420	3580	D	ug/Kg	☼	105	24 - 134
Benzo[k]fluoranthene - DL	410	U D	3420	2720	D	ug/Kg	☼	80	43 - 114
bis(2 chloro-1-methylethyl) ether - DL	210	U D	3420	2370	D	ug/Kg	☼	69	38 - 98
Bis(2-chloroethoxy)methane - DL	190	U D	3420	2670	D	ug/Kg	☼	78	49 - 100
Bis(2-chloroethyl)ether - DL	170	U D	3420	2510	D	ug/Kg	☼	74	49 - 100
Bis(2-ethylhexyl) phthalate - DL	440	U D	3420	3030	D	ug/Kg	☼	89	50 - 113
Butyl benzyl phthalate - DL	470	U D	3420	3080	D	ug/Kg	☼	90	54 - 112
Carbazole - DL	240	U D	3420	2780	D	ug/Kg	☼	82	47 - 102
Chrysene - DL	230	U D	3420	2750	D	ug/Kg	☼	80	45 - 115
Dibenz(a,h)anthracene - DL	340	U D	3420	3230	D	ug/Kg	☼	94	30 - 134
Dibenzofuran - DL	210	U D	3420	2700	D	ug/Kg	☼	79	50 - 102
Diethylphthalate - DL	420	U D	3420	2840	D	ug/Kg	☼	83	46 - 107
Di-n-butyl phthalate - DL	330	U D	3420	2870	D	ug/Kg	☼	84	49 - 107
Di-n-octyl phthalate - DL	680	U D	3420	3140	D	ug/Kg	☼	92	35 - 125
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3220	D	ug/Kg	☼	94	33 - 140
Fluoranthene - DL	260	U D	3420	2890	D	ug/Kg	☼	85	45 - 109
Fluorene - DL	230	U D	3420	2760	D	ug/Kg	☼	81	45 - 109
Hexachlorobenzene - DL	220	U D	3420	2640	D	ug/Kg	☼	77	48 - 113
Hexachlorobutadiene - DL	200	U D	3420	2620	D	ug/Kg	☼	77	48 - 109
Hexachlorocyclopentadiene - DL	1700	U D	3420	2170	J D	ug/Kg	☼	64	21 - 144
Hexachloroethane - DL	180	U D	3420	2310	D	ug/Kg	☼	68	44 - 102
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3380	D	ug/Kg	☼	99	30 - 136
Isophorone - DL	190	U D	3420	2420	D	ug/Kg	☼	71	48 - 100
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98
Nitrobenzene - DL	210	U D	3420	2680	D	ug/Kg	☼	78	51 - 106
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2620	D	ug/Kg	☼	77	47 - 104
Pentachlorophenol - DL	1700	U D	3420	2500	J D	ug/Kg	☼	73	23 - 116
Phenanthrene - DL	220	U D	3420	2780	D	ug/Kg	☼	82	53 - 106
Phenol - DL	190	U D	3420	2700	D	ug/Kg	☼	79	41 - 100
Pyrene - DL	370	U D	3420	2780	D	ug/Kg	☼	81	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*63*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*81*		*59 - 110*
2-Fluorophenol (Surr) - DL	*75*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*76*		*44 - 120*
Phenol-d5 (Surr) - DL	*76*		*51 - 104*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-A-1-B MS
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 402691

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Terphenyl-d14 (Surr) - DL	*82*		*59 - 98*

Lab Sample ID: 160-31915-A-1-C MSD
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene - DL	170	U D	3420	2380	D	ug/Kg	☼	70	52 - 103	3	30
1,2-Dichlorobenzene - DL	180	U D	3420	2430	D	ug/Kg	☼	71	50 - 98	4	30
1,3-Dichlorobenzene - DL	190	U D	3420	2380	D	ug/Kg	☼	70	49 - 96	5	30
1,4-Dichlorobenzene - DL	190	U D	3420	2330	D	ug/Kg	☼	68	50 - 96	1	30
2,4,5-Trichlorophenol - DL	270	U D	3420	2710	D	ug/Kg	☼	79	41 - 116	2	30
2,4,6-Trichlorophenol - DL	230	U D	3420	2750	D	ug/Kg	☼	81	40 - 115	2	30
2,4-Dichlorophenol - DL	200	U D	3420	2740	D	ug/Kg	☼	80	47 - 104	2	30
2,4-Dimethylphenol - DL	280	U D	3420	2720	D	ug/Kg	☼	80	45 - 105	10	30
2,4-Dinitrophenol - DL	1700	U D	3420	1860	J D	ug/Kg	☼	54	10 - 100	13	30
2,4-Dinitrotoluene - DL	640	U D	3420	2850	D	ug/Kg	☼	84	42 - 113	5	30
2,6-Dinitrotoluene - DL	320	U D	3420	2660	D	ug/Kg	☼	78	46 - 109	5	30
2-Chloronaphthalene - DL	190	U D	3420	2750	D	ug/Kg	☼	80	52 - 108	1	30
2-Chlorophenol - DL	200	U D	3420	2690	D	ug/Kg	☼	79	48 - 102	6	30
2-Methylnaphthalene - DL	210	U D	3420	2710	D	ug/Kg	☼	79	55 - 97	4	30
2-Methylphenol - DL	220	U D	3420	2710	D	ug/Kg	☼	79	46 - 98	8	30
2-Nitroaniline - DL	610	U D	3420	2650	D	ug/Kg	☼	78	45 - 111	2	30
2-Nitrophenol - DL	740	U D	3420	2610	D	ug/Kg	☼	76	38 - 115	9	30
3 & 4 Methylphenol - DL	340	U D	3420	3000	J D	ug/Kg	☼	88	48 - 111	0	30
3,3'-Dichlorobenzidine - DL	580	U D	3420	2300	J D	ug/Kg	☼	67	23 - 102	11	30
3-Nitroaniline - DL	520	U D	3420	2520	D	ug/Kg	☼	74	32 - 95	2	30
4,6-Dinitro-2-methylphenol - DL	1700	U D	3420	2590	J D	ug/Kg	☼	76	15 - 118	1	30
4-Bromophenyl phenyl ether - DL	250	U D	3420	2840	D	ug/Kg	☼	83	53 - 110	6	30
4-Chloro-3-methylphenol - DL	220	U D	3420	2740	D	ug/Kg	☼	80	36 - 111	2	30
4-Chloroaniline - DL	240	U D	3420	1900	D	ug/Kg	☼	56	32 - 79	2	30
4-Chlorophenyl phenyl ether - DL	220	U D	3420	2650	D	ug/Kg	☼	78	51 - 103	1	30
4-Nitroaniline - DL	380	U D	3420	2860	J D	ug/Kg	☼	84	36 - 102	3	30
4-Nitrophenol - DL	1700	U D	3420	3030	J D	ug/Kg	☼	89	40 - 113	13	30
Acenaphthene - DL	180	U D	3420	2780	D	ug/Kg	☼	81	53 - 105	4	30
Acenaphthylene - DL	230	U D	3420	2700	D	ug/Kg	☼	79	55 - 107	4	30
Anthracene - DL	250	U D	3420	2760	D	ug/Kg	☼	81	55 - 103	4	30
Benzo[a]anthracene - DL	300	U D	3420	2850	D	ug/Kg	☼	83	48 - 112	5	30
Benzo[a]pyrene - DL	460	U D	3420	2920	D	ug/Kg	☼	86	46 - 117	6	30
Benzo[b]fluoranthene - DL	170	U D	3420	2880	D	ug/Kg	☼	84	45 - 125	6	30
Benzo[g,h,i]perylene - DL	170	U D	3420	3760	D	ug/Kg	☼	110	24 - 134	5	30
Benzo[k]fluoranthene - DL	410	U D	3420	2810	D	ug/Kg	☼	82	43 - 114	3	30
bis(2 chloro-1-methylethyl) ether - DL	210	U D	3420	2300	D	ug/Kg	☼	67	38 - 98	3	30
Bis(2-chloroethoxy)methane - DL	190	U D	3420	2670	D	ug/Kg	☼	78	49 - 100	0	30
Bis(2-chloroethyl)ether - DL	170	U D	3420	2290	D	ug/Kg	☼	67	49 - 100	9	30
Bis(2-ethylhexyl) phthalate - DL	440	U D	3420	3150	D	ug/Kg	☼	92	50 - 113	4	30
Butyl benzyl phthalate - DL	470	U D	3420	3230	D	ug/Kg	☼	95	54 - 112	5	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-A-1-C MSD
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbazole - DL	240	U D	3420	2960	D	ug/Kg	☼	87	47 - 102	6	30
Chrysene - DL	230	U D	3420	2820	D	ug/Kg	☼	83	45 - 115	3	30
Dibenz(a,h)anthracene - DL	340	U D	3420	3320	D	ug/Kg	☼	97	30 - 134	3	30
Dibenzofuran - DL	210	U D	3420	2820	D	ug/Kg	☼	83	50 - 102	4	30
Diethylphthalate - DL	420	U D	3420	2900	D	ug/Kg	☼	85	46 - 107	2	30
Di-n-butyl phthalate - DL	330	U D	3420	3080	D	ug/Kg	☼	90	49 - 107	7	30
Di-n-octyl phthalate - DL	680	U D	3420	3170	D	ug/Kg	☼	93	35 - 125	1	30
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3400	D	ug/Kg	☼	100	33 - 140	5	30
Fluoranthene - DL	260	U D	3420	3070	D	ug/Kg	☼	90	45 - 109	6	30
Fluorene - DL	230	U D	3420	3060	D	ug/Kg	☼	90	45 - 109	11	30
Hexachlorobenzene - DL	220	U D	3420	2890	D	ug/Kg	☼	85	48 - 113	9	30
Hexachlorobutadiene - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 109	3	30
Hexachlorocyclopentadiene - DL	1700	U D	3420	2080	J D	ug/Kg	☼	61	21 - 144	5	30
Hexachloroethane - DL	180	U D	3420	2330	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3580	D	ug/Kg	☼	105	30 - 136	6	30
Isophorone - DL	190	U D	3420	2450	D	ug/Kg	☼	72	48 - 100	1	30
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98	0	30
Nitrobenzene - DL	210	U D	3420	2570	D	ug/Kg	☼	75	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2700	D	ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol - DL	1700	U D	3420	2320	J D	ug/Kg	☼	68	23 - 116	8	30
Phenanthrene - DL	220	U D	3420	2950	D	ug/Kg	☼	86	53 - 106	6	30
Phenol - DL	190	U D	3420	2720	D	ug/Kg	☼	80	41 - 100	1	30
Pyrene - DL	370	U D	3420	2930	D	ug/Kg	☼	86	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*82*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*73*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*78*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31919-2	B3MMP6	114	99	109	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31915-D-2-A MS	Matrix Spike	98	102	97	100
160-31915-E-2-A MSD	Matrix Spike Duplicate	99	104	100	104
LCS 160-405466/5	Lab Control Sample	96	97	98	102
LCSD 160-405466/6	Lab Control Sample Dup	96	100	100	100
MB 160-405466/8	Method Blank	101	99	102	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31919-2	B3MMP6	60	76	74	66	76	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-31915-A-1-B MS - DL	Matrix Spike	63	81	75	76	76	82
160-31915-A-1-C MSD - DL	Matrix Spike Duplicate	82	83	73	73	78	89

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-402691/2-A	Lab Control Sample	82	84	82	79	82	80
MB 160-402691/1-A	Method Blank	69	79	79	69	78	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31919-1	B3MMP5	92	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31887-C-5-B MS	Matrix Spike	97	95
160-31887-C-5-C MSD	Matrix Spike Duplicate	92	89
LCS 160-402188/2-A	Lab Control Sample	104	99
MB 160-402188/1-A	Method Blank	105	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-31919-1	B3MMP5	74

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-31841-E-4-A MSD
Matrix: Solid
Analysis Batch: 407502

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 407503

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.1	U	39.3	37.1		ug/Kg	☼	95	62 - 118	1	20
4-Methyl-2-pentanone (MIBK)	2.3	U	39.3	36.5		ug/Kg	☼	93	73 - 125	3	20
Acetone	6.0	U	39.3	38.2		ug/Kg	☼	97	54 - 139	5	20
Benzene	0.24	U	39.3	41.0		ug/Kg	☼	104	80 - 120	11	20
Bromodichloromethane	0.46	U	39.3	41.5		ug/Kg	☼	106	80 - 120	11	20
Bromoform	1.8	U	39.3	43.1		ug/Kg	☼	110	80 - 125	7	20
Bromomethane	2.2	U	39.3	38.9		ug/Kg	☼	99	70 - 126	12	20
Carbon disulfide	0.64	U	39.3	40.9		ug/Kg	☼	104	79 - 121	14	20
Carbon tetrachloride	0.47	U	39.3	41.2		ug/Kg	☼	105	80 - 120	15	20
Chlorobenzene	0.75	U	39.3	40.8		ug/Kg	☼	104	80 - 120	9	20
Chloroethane	1.8	U	39.3	37.7		ug/Kg	☼	96	64 - 133	12	20
Chloroform	0.35	U	39.3	40.2		ug/Kg	☼	103	80 - 120	13	20
Chloromethane	0.60	U	39.3	35.6		ug/Kg	☼	91	75 - 120	10	20
cis-1,3-Dichloropropene	1.9	U	39.3	43.7		ug/Kg	☼	111	80 - 120	12	20
Dibromochloromethane	1.1	U	39.3	42.6		ug/Kg	☼	109	80 - 120	8	20
Ethylbenzene	0.64	U	39.3	41.2		ug/Kg	☼	105	80 - 120	8	20
Methylene Chloride	1.5	U	39.3	40.9		ug/Kg	☼	104	77 - 123	12	20
Styrene	1.8	U	39.3	42.6		ug/Kg	☼	109	80 - 120	9	20
Tetrachloroethene	0.52	U	39.3	40.5		ug/Kg	☼	103	80 - 120	12	20
Toluene	2.3	U	39.3	42.6		ug/Kg	☼	108	80 - 124	9	20
trans-1,3-Dichloropropene	1.6	U	39.3	44.3		ug/Kg	☼	113	80 - 122	6	20
Trichloroethene	0.36	U	39.3	40.6		ug/Kg	☼	103	79 - 120	13	20
Vinyl chloride	0.40	U	39.3	40.0		ug/Kg	☼	102	71 - 120	7	20
Xylenes, Total	0.78	U T	78.5	96.3	T	ug/Kg	☼	123	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*67 - 132*
4-Bromofluorobenzene (Surr)	*101*		*59 - 150*
Dibromofluoromethane (Surr)	*106*		*53 - 143*
Toluene-d8 (Surr)	*106*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Dioxane	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
1-Naphthylamine	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Chlorophenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Naphthylamine	61	U	330	61	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitroaniline	120	U	330	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Nitrophenol	140	U	330	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
2-Picoline	45	U	660	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
3-Nitroaniline	100	U	330	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chloroaniline	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroaniline	75	U	1600	75	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitrophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acenaphthylene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Acetophenone	34	U	330	34	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aniline	60	U	330	60	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Anthracene	49	U	330	49	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Aramite	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Benzyl alcohol	52	U	330	52	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Carbazole	47	U	330	47	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chlorobenzilate	94	U	330	94	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Chrysene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diallate	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dibenzofuran	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diethylphthalate	82	U	330	82	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dimethoate	100	U	660	100	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dimethyl phthalate	45	U	330	45	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Dinoseb	330	U	660	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Disulfoton	41	U	1600	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Famphur	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluoranthene	50	U	330	50	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Fluorene	46	U	330	46	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobenzene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloroethane	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachlorophene	330	U	8300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Hexachloropropene	33	U	3300	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isodrin	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isophorone	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Isosafrole	67	U	660	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Kepone	330	U	3300	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methapyrilene	140	U	1600	140	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Methyl parathion	120	U	1600	120	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Naphthalene	35	U	330	35	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Nitrobenzene	40	U	330	40	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-403615/1-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Parathion	98	U	1600	98	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorobenzene	33	U	330	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloroethane	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pentachlorophenol	330	U	1600	330	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenacetin	54	U	660	54	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenanthrene	42	U	330	42	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phenol	38	U	330	38	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Phorate	37	U	1600	37	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pronamide	53	U	660	53	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyrene	73	U	330	73	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Pyridine	71	U	660	71	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Safrole	33	U	660	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		11/30/18 12:32	12/05/18 17:15	1
Tributyl phosphate	63	U	330	63	ug/Kg		11/30/18 12:32	12/05/18 17:15	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*608*	*N J*	*ug/Kg*		*4.27*	*141-79-7*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*11700*	*N*	*ug/Kg*		*4.61*		*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Pentanone, 4-methoxy-4-methyl-	*649*	*N J*	*ug/Kg*		*5.15*	*107-70-0*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
n-Hexadecanoic acid	*318*	*N J*	*ug/Kg*		*11.00*	*57-10-3*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Unknown	*191*	*N*	*ug/Kg*		*13.91*		*11/30/18 12:32*	*12/05/18 17:15*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*68*		*47 - 125*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
2-Fluorophenol (Surr)	*80*		*54 - 102*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Nitrobenzene-d5 (Surr)	*70*		*44 - 120*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Phenol-d5 (Surr)	*80*		*51 - 104*	*11/30/18 12:32*	*12/05/18 17:15*	*1*
Terphenyl-d14 (Surr)	*87*		*59 - 98*	*11/30/18 12:32*	*12/05/18 17:15*	*1*

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2350		ug/Kg		70	58 - 101
1,2-Dichlorobenzene	3330	2470		ug/Kg		74	57 - 99
1,3-Dichlorobenzene	3330	2350		ug/Kg		70	55 - 98
1,4-Dichlorobenzene	3330	2520		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2650		ug/Kg		79	56 - 109
2,4,6-Trichlorophenol	3330	2770		ug/Kg		83	56 - 110
2,4-Dichlorophenol	3330	2790		ug/Kg		84	57 - 99

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dimethylphenol	3330	2670		ug/Kg		80	53 - 97
2,4-Dinitrophenol	3330	2520		ug/Kg		76	10 - 89
2,4-Dinitrotoluene	3330	2690		ug/Kg		81	54 - 105
2,6-Dinitrotoluene	3330	2630		ug/Kg		79	55 - 105
2-Chloronaphthalene	3330	2670		ug/Kg		80	56 - 111
2-Chlorophenol	3330	2700		ug/Kg		81	56 - 99
2-Methylnaphthalene	3330	2640		ug/Kg		79	58 - 98
2-Methylphenol	3330	2800		ug/Kg		84	53 - 97
2-Nitroaniline	3330	2700		ug/Kg		81	55 - 108
2-Nitrophenol	3330	2570		ug/Kg		77	59 - 104
3 & 4 Methylphenol	3330	3200		ug/Kg		96	58 - 108
3,3'-Dichlorobenzidine	3330	2450		ug/Kg		73	42 - 104
3-Nitroaniline	3330	2540		ug/Kg		76	43 - 96
4,6-Dinitro-2-methylphenol	3330	2970		ug/Kg		89	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2780		ug/Kg		83	54 - 98
4-Chloroaniline	3330	2190		ug/Kg		66	41 - 83
4-Chlorophenyl phenyl ether	3330	2650		ug/Kg		79	55 - 105
4-Nitroaniline	3330	2870		ug/Kg		86	49 - 99
4-Nitrophenol	3330	2710		ug/Kg		81	48 - 106
Acenaphthene	3330	2730		ug/Kg		82	55 - 106
Acenaphthylene	3330	2680		ug/Kg		80	56 - 109
Anthracene	3330	2900		ug/Kg		87	56 - 103
Benzo[a]anthracene	3330	2870		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2900		ug/Kg		87	57 - 109
Benzo[b]fluoranthene	3330	2860		ug/Kg		86	68 - 109
Benzo[g,h,i]perylene	3330	2490		ug/Kg		75	51 - 126
Benzo[k]fluoranthene	3330	2830		ug/Kg		85	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2540		ug/Kg		76	49 - 94
Bis(2-chloroethoxy)methane	3330	2710		ug/Kg		81	56 - 99
Bis(2-chloroethyl)ether	3330	2580		ug/Kg		77	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3120		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	2980		ug/Kg		89	60 - 112
Carbazole	3330	2960		ug/Kg		89	53 - 98
Chrysene	3330	2860		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	2470		ug/Kg		74	52 - 126
Dibenzofuran	3330	2670		ug/Kg		80	55 - 103
Diethylphthalate	3330	2830		ug/Kg		85	54 - 101
Di-n-butyl phthalate	3330	3010		ug/Kg		90	57 - 102
Di-n-octyl phthalate	3330	3300		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3490		ug/Kg		105	63 - 121
Fluoranthene	3330	2930		ug/Kg		88	54 - 100
Fluorene	3330	2780		ug/Kg		83	57 - 106
Hexachlorobenzene	3330	2890		ug/Kg		87	57 - 109
Hexachlorobutadiene	3330	2490		ug/Kg		75	59 - 106
Hexachlorocyclopentadiene	3330	2310		ug/Kg		69	44 - 140
Hexachloroethane	3330	2460		ug/Kg		74	56 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-403615/2-A
Matrix: Solid
Analysis Batch: 404143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Indeno[1,2,3-cd]pyrene	3330	2550		ug/Kg		76	52 - 132
Isophorone	3330	2550		ug/Kg		76	55 - 96
Naphthalene	3330	2560		ug/Kg		77	57 - 98
Nitrobenzene	3330	2690		ug/Kg		81	58 - 102
N-Nitrosodi-n-propylamine	3330	2990		ug/Kg		90	54 - 98
Pentachlorophenol	3330	2680		ug/Kg		80	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2830		ug/Kg		85	50 - 96
Pyrene	3330	2870		ug/Kg		86	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*80*		*44 - 120*
Phenol-d5 (Surr)	*84*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Lab Sample ID: 160-32018-1 MS
Matrix: Soil
Analysis Batch: 404143

Client Sample ID: B3MMR0
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	33	U	3320	2450		ug/Kg	☼	74	52 - 103
1,2-Dichlorobenzene	35	U	3320	2420		ug/Kg	☼	73	50 - 98
1,3-Dichlorobenzene	36	U	3320	2390		ug/Kg	☼	72	49 - 96
1,4-Dichlorobenzene	37	U	3320	2400		ug/Kg	☼	72	50 - 96
2,4,5-Trichlorophenol	52	U	3320	2740		ug/Kg	☼	83	41 - 116
2,4,6-Trichlorophenol	46	U	3320	2840		ug/Kg	☼	86	40 - 115
2,4-Dichlorophenol	39	U	3320	2860		ug/Kg	☼	86	47 - 104
2,4-Dimethylphenol	55	U	3320	2650		ug/Kg	☼	80	45 - 105
2,4-Dinitrophenol	330	U	3320	2490		ug/Kg	☼	75	10 - 100
2,4-Dinitrotoluene	130	U	3320	2850		ug/Kg	☼	86	42 - 113
2,6-Dinitrotoluene	62	U	3320	2850		ug/Kg	☼	86	46 - 109
2-Chloronaphthalene	37	U	3320	2820		ug/Kg	☼	85	52 - 108
2-Chlorophenol	38	U	3320	2710		ug/Kg	☼	82	48 - 102
2-Methylnaphthalene	40	U	3320	2680		ug/Kg	☼	81	55 - 97
2-Methylphenol	42	U	3320	2630		ug/Kg	☼	79	46 - 98
2-Nitroaniline	120	U	3320	2790		ug/Kg	☼	84	45 - 111
2-Nitrophenol	140	U	3320	2740		ug/Kg	☼	82	38 - 115
3 & 4 Methylphenol	66	U	3320	2990		ug/Kg	☼	90	48 - 111
3,3'-Dichlorobenzidine	110	U	3320	2300		ug/Kg	☼	69	23 - 102
3-Nitroaniline	100	U	3320	2590		ug/Kg	☼	78	32 - 95
4,6-Dinitro-2-methylphenol	330	U	3320	2980		ug/Kg	☼	90	15 - 118
4-Bromophenyl phenyl ether	49	U	3320	2750		ug/Kg	☼	83	53 - 110
4-Chloro-3-methylphenol	42	U	3320	2800		ug/Kg	☼	84	36 - 111
4-Chloroaniline	46	U	3320	2150		ug/Kg	☼	65	32 - 79
4-Chlorophenyl phenyl ether	43	U	3320	2760		ug/Kg	☼	83	51 - 103

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32018-1 MS
Matrix: Soil
Analysis Batch: 404143

Client Sample ID: B3MMR0
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitroaniline	74	U	3320	2880		ug/Kg	☼	87	36 - 102
4-Nitrophenol	330	U	3320	2790		ug/Kg	☼	84	40 - 113
Acenaphthene	35	U	3320	2830		ug/Kg	☼	85	53 - 105
Acenaphthylene	46	U	3320	2780		ug/Kg	☼	84	55 - 107
Anthracene	49	U	3320	2800		ug/Kg	☼	84	55 - 103
Benzo[a]anthracene	59	U	3320	2890		ug/Kg	☼	87	48 - 112
Benzo[a]pyrene	89	U	3320	2730		ug/Kg	☼	82	46 - 117
Benzo[b]fluoranthene	33	U	3320	2800		ug/Kg	☼	84	45 - 125
Benzo[g,h,i]perylene	33	U	3320	2520		ug/Kg	☼	76	24 - 134
Benzo[k]fluoranthene	80	U	3320	2700		ug/Kg	☼	81	43 - 114
bis(2 chloro-1-methylethyl) ether	42	U	3320	2410		ug/Kg	☼	73	38 - 98
Bis(2-chloroethoxy)methane	37	U	3320	2800		ug/Kg	☼	84	49 - 100
Bis(2-chloroethyl)ether	33	U	3320	2400		ug/Kg	☼	72	49 - 100
Bis(2-ethylhexyl) phthalate	85	U	3320	3120		ug/Kg	☼	94	50 - 113
Butyl benzyl phthalate	92	U	3320	3020		ug/Kg	☼	91	54 - 112
Carbazole	47	U	3320	2920		ug/Kg	☼	88	47 - 102
Chrysene	45	U	3320	2910		ug/Kg	☼	88	45 - 115
Dibenz(a,h)anthracene	66	U	3320	2510		ug/Kg	☼	75	30 - 134
Dibenzofuran	40	U	3320	2820		ug/Kg	☼	85	50 - 102
Diethylphthalate	81	U	3320	3010		ug/Kg	☼	90	46 - 107
Di-n-butyl phthalate	64	U	3320	2980		ug/Kg	☼	90	49 - 107
Di-n-octyl phthalate	130	U	3320	3300		ug/Kg	☼	99	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	33	U	3320	3390		ug/Kg	☼	102	33 - 140
Fluoranthene	50	U	3320	2870		ug/Kg	☼	86	45 - 109
Fluorene	45	U	3320	2890		ug/Kg	☼	87	45 - 109
Hexachlorobenzene	42	U	3320	2700		ug/Kg	☼	81	48 - 113
Hexachlorobutadiene	40	U	3320	2570		ug/Kg	☼	77	48 - 109
Hexachlorocyclopentadiene	330	U	3320	2490		ug/Kg	☼	75	21 - 144
Hexachloroethane	34	U	3320	2450		ug/Kg	☼	74	44 - 102
Indeno[1,2,3-cd]pyrene	63	U	3320	2500		ug/Kg	☼	75	30 - 136
Isophorone	37	U	3320	2560		ug/Kg	☼	77	48 - 100
Naphthalene	35	U	3320	2620		ug/Kg	☼	79	54 - 98
Nitrobenzene	40	U	3320	2790		ug/Kg	☼	84	51 - 106
N-Nitrosodi-n-propylamine	40	U	3320	2710		ug/Kg	☼	82	47 - 104
Pentachlorophenol	330	U	3320	2590		ug/Kg	☼	78	23 - 116
Phenanthrene	42	U	3320	2820		ug/Kg	☼	85	53 - 106
Phenol	38	U	3320	2680		ug/Kg	☼	81	41 - 100
Pyrene	73	U	3320	2910		ug/Kg	☼	88	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*83*		*54 - 102*
Nitrobenzene-d5 (Surr)	*83*		*44 - 120*
Phenol-d5 (Surr)	*83*		*51 - 104*
Terphenyl-d14 (Surr)	*90*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32018-1 MSD
Matrix: Soil
Analysis Batch: 404143

Client Sample ID: B3MMR0
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	33	U	3330	2450		ug/Kg	☼	74	52 - 103	0	30
1,2-Dichlorobenzene	35	U	3330	2370		ug/Kg	☼	71	50 - 98	2	30
1,3-Dichlorobenzene	36	U	3330	2350		ug/Kg	☼	71	49 - 96	2	30
1,4-Dichlorobenzene	37	U	3330	2410		ug/Kg	☼	72	50 - 96	0	30
2,4,5-Trichlorophenol	52	U	3330	2630		ug/Kg	☼	79	41 - 116	4	30
2,4,6-Trichlorophenol	46	U	3330	2790		ug/Kg	☼	84	40 - 115	2	30
2,4-Dichlorophenol	39	U	3330	2730		ug/Kg	☼	82	47 - 104	5	30
2,4-Dimethylphenol	55	U	3330	2390		ug/Kg	☼	72	45 - 105	11	30
2,4-Dinitrophenol	330	U	3330	2310		ug/Kg	☼	69	10 - 100	8	30
2,4-Dinitrotoluene	130	U	3330	2790		ug/Kg	☼	84	42 - 113	2	30
2,6-Dinitrotoluene	62	U	3330	2660		ug/Kg	☼	80	46 - 109	7	30
2-Chloronaphthalene	37	U	3330	2650		ug/Kg	☼	80	52 - 108	6	30
2-Chlorophenol	38	U	3330	2610		ug/Kg	☼	78	48 - 102	4	30
2-Methylnaphthalene	40	U	3330	2620		ug/Kg	☼	79	55 - 97	2	30
2-Methylphenol	42	U	3330	2560		ug/Kg	☼	77	46 - 98	2	30
2-Nitroaniline	120	U	3330	2590		ug/Kg	☼	78	45 - 111	7	30
2-Nitrophenol	140	U	3330	2620		ug/Kg	☼	79	38 - 115	5	30
3 & 4 Methylphenol	66	U	3330	2990		ug/Kg	☼	90	48 - 111	0	30
3,3'-Dichlorobenzidine	110	U	3330	2260		ug/Kg	☼	68	23 - 102	2	30
3-Nitroaniline	100	U	3330	2400		ug/Kg	☼	72	32 - 95	8	30
4,6-Dinitro-2-methylphenol	330	U	3330	2930		ug/Kg	☼	88	15 - 118	2	30
4-Bromophenyl phenyl ether	49	U	3330	2810		ug/Kg	☼	84	53 - 110	2	30
4-Chloro-3-methylphenol	42	U	3330	2750		ug/Kg	☼	83	36 - 111	2	30
4-Chloroaniline	46	U	3330	2000		ug/Kg	☼	60	32 - 79	7	30
4-Chlorophenyl phenyl ether	43	U	3330	2660		ug/Kg	☼	80	51 - 103	4	30
4-Nitroaniline	74	U	3330	2820		ug/Kg	☼	85	36 - 102	2	30
4-Nitrophenol	330	U	3330	2610		ug/Kg	☼	79	40 - 113	6	30
Acenaphthene	35	U	3330	2700		ug/Kg	☼	81	53 - 105	5	30
Acenaphthylene	46	U	3330	2650		ug/Kg	☼	80	55 - 107	5	30
Anthracene	49	U	3330	2760		ug/Kg	☼	83	55 - 103	2	30
Benzo[a]anthracene	59	U	3330	2810		ug/Kg	☼	85	48 - 112	3	30
Benzo[a]pyrene	89	U	3330	2760		ug/Kg	☼	83	46 - 117	1	30
Benzo[b]fluoranthene	33	U	3330	2840		ug/Kg	☼	85	45 - 125	2	30
Benzo[g,h,i]perylene	33	U	3330	2500		ug/Kg	☼	75	24 - 134	1	30
Benzo[k]fluoranthene	80	U	3330	2690		ug/Kg	☼	81	43 - 114	0	30
bis(2 chloro-1-methylethyl) ether	42	U	3330	2330		ug/Kg	☼	70	38 - 98	3	30
Bis(2-chloroethoxy)methane	37	U	3330	2670		ug/Kg	☼	80	49 - 100	5	30
Bis(2-chloroethyl)ether	33	U	3330	2300		ug/Kg	☼	69	49 - 100	4	30
Bis(2-ethylhexyl) phthalate	85	U	3330	2990		ug/Kg	☼	90	50 - 113	4	30
Butyl benzyl phthalate	92	U	3330	2880		ug/Kg	☼	87	54 - 112	5	30
Carbazole	47	U	3330	2840		ug/Kg	☼	85	47 - 102	3	30
Chrysene	45	U	3330	2800		ug/Kg	☼	84	45 - 115	4	30
Dibenz(a,h)anthracene	66	U	3330	2470		ug/Kg	☼	74	30 - 134	2	30
Dibenzofuran	40	U	3330	2640		ug/Kg	☼	79	50 - 102	7	30
Diethylphthalate	81	U	3330	2810		ug/Kg	☼	84	46 - 107	7	30
Di-n-butyl phthalate	64	U	3330	2860		ug/Kg	☼	86	49 - 107	4	30
Di-n-octyl phthalate	130	U	3330	3150		ug/Kg	☼	95	35 - 125	5	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32018-1 MSD
Matrix: Soil
Analysis Batch: 404143

Client Sample ID: B3MMR0
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	33	U	3330	3280		ug/Kg	☼	99	33 - 140	3	30
Fluoranthene	50	U	3330	2780		ug/Kg	☼	84	45 - 109	3	30
Fluorene	45	U	3330	2750		ug/Kg	☼	83	45 - 109	5	30
Hexachlorobenzene	42	U	3330	2770		ug/Kg	☼	83	48 - 113	2	30
Hexachlorobutadiene	40	U	3330	2620		ug/Kg	☼	79	48 - 109	2	30
Hexachlorocyclopentadiene	330	U	3330	2420		ug/Kg	☼	73	21 - 144	3	30
Hexachloroethane	34	U	3330	2340		ug/Kg	☼	70	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	63	U	3330	2540		ug/Kg	☼	76	30 - 136	2	30
Isophorone	37	U	3330	2440		ug/Kg	☼	73	48 - 100	5	30
Naphthalene	35	U	3330	2570		ug/Kg	☼	77	54 - 98	2	30
Nitrobenzene	40	U	3330	2650		ug/Kg	☼	80	51 - 106	5	30
N-Nitrosodi-n-propylamine	40	U	3330	2630		ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol	330	U	3330	2570		ug/Kg	☼	77	23 - 116	1	30
Phenanthrene	42	U	3330	2800		ug/Kg	☼	84	53 - 106	1	30
Phenol	38	U	3330	2650		ug/Kg	☼	80	41 - 100	1	30
Pyrene	73	U	3330	2830		ug/Kg	☼	85	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*80*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*81*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32018-1	B3MMR0	110	98	105	102

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-31841-D-4-A MS	Matrix Spike	102	99	105	101
160-31841-E-4-A MSD	Matrix Spike Duplicate	103	101	106	106
LCS 160-407502/5	Lab Control Sample	94	99	101	104
LCSD 160-407502/6	Lab Control Sample Dup	95	100	102	104
MB 160-407502/8	Method Blank	98	95	102	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32018-1	B3MMR0	67	76	78	65	77	81
160-32018-1 MS	B3MMR0	82	85	83	83	83	90
160-32018-1 MSD	B3MMR0	80	82	80	79	81	86

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32018-2	B3MMP9	79	75
160-32018-2 MS	B3MMP9	85	72
160-32018-2 MSD	B3MMP9	81	77

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-32018-2	B3MMP9	94
160-32018-2 MS	B3MMP9	86
160-32018-2 MSD	B3MMP9	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 160-405738/6
Matrix: Solid
Analysis Batch: 405738

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane			50.0	52.2		ug/Kg		104	80 - 126	2	20
2-Butanone (MEK)			50.0	48.4		ug/Kg		97	41 - 140	6	20
2-Hexanone			50.0	44.1		ug/Kg		88	63 - 136	1	20
4-Methyl-2-pentanone (MIBK)			50.0	43.2		ug/Kg		86	67 - 130	3	20
Acetone			50.0	40.1		ug/Kg		80	39 - 140	4	20
Benzene			50.0	50.7		ug/Kg		101	80 - 120	1	20
Bromodichloromethane			50.0	52.4		ug/Kg		105	78 - 124	0	20
Bromoform			50.0	49.0		ug/Kg		98	67 - 135	3	20
Bromomethane			50.0	49.7		ug/Kg		99	61 - 132	3	20
Carbon disulfide			50.0	50.8		ug/Kg		102	74 - 124	2	20
Carbon tetrachloride			50.0	50.6		ug/Kg		101	68 - 130	0	20
Chlorobenzene			50.0	51.0		ug/Kg		102	80 - 120	0	20
Chloroethane			50.0	45.7		ug/Kg		91	73 - 129	1	20
Chloroform			50.0	49.5		ug/Kg		99	78 - 120	2	20
Chloromethane			50.0	58.4		ug/Kg		117	69 - 123	4	20
cis-1,3-Dichloropropene			50.0	56.5		ug/Kg		113	78 - 127	2	20
Dibromochloromethane			50.0	50.2		ug/Kg		100	77 - 126	1	20
Ethylbenzene			50.0	51.1		ug/Kg		102	79 - 126	1	20
Methylene Chloride			50.0	51.5		ug/Kg		103	76 - 120	0	20
Styrene			50.0	54.9		ug/Kg		110	80 - 129	0	20
Tetrachloroethene			50.0	50.8		ug/Kg		102	76 - 126	2	20
Toluene			50.0	53.7		ug/Kg		107	76 - 136	1	20
trans-1,3-Dichloropropene			50.0	52.6		ug/Kg		105	77 - 136	0	20
Trichloroethene			50.0	50.4		ug/Kg		101	66 - 130	0	20
Vinyl chloride			50.0	55.3		ug/Kg		111	56 - 134	3	20
Xylenes, Total			100	110		ug/Kg		110	79 - 132	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*67 - 132*
4-Bromofluorobenzene (Surr)	*96*		*59 - 150*
Dibromofluoromethane (Surr)	*99*		*53 - 143*
Toluene-d8 (Surr)	*100*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Methylphenol	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
2-Picoline	45	U	660	45	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acenaphthene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acenaphthylene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Acetophenone	34	U	330	34	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Aniline	60	U	330	60	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Anthracene	49	U	330	49	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Aramite	330	U	660	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Carbazole	47	U	330	47	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Chrysene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diallate	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dibenzofuran	41	U	330	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diethylphthalate	82	U	330	82	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dimethoate	100	U	660	100	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Dinoseb	330	U	660	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Disulfoton	41	U	1600	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Famphur	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Fluoranthene	50	U	330	50	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Fluorene	46	U	330	46	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachloroethane	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isodrin	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isophorone	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Isosafrole	67	U	660	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Kepone	330	U	3300	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methapyrilene	140	U	1600	140	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Methyl parathion	120	U	1600	120	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Naphthalene	35	U	330	35	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Nitrobenzene	40	U	330	40	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404121/1-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
o-Toluidine	51	U	330	51	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Parathion	98	U	1600	98	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenacetin	54	U	660	54	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenanthrene	42	U	330	42	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phenol	38	U	330	38	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Phorate	37	U	1600	37	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pronamide	53	U	660	53	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pyrene	73	U	330	73	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Pyridine	71	U	660	71	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Safrole	33	U	660	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/04/18 15:56	12/10/18 11:13	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/04/18 15:56	12/10/18 11:13	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*498*	*N J*	*ug/Kg*		*4.26*	*141-79-7*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Unknown	*11500*	*N*	*ug/Kg*		*4.61*		*12/04/18 15:56*	*12/10/18 11:13*	*1*
Unknown	*506*	*N*	*ug/Kg*		*5.15*		*12/04/18 15:56*	*12/10/18 11:13*	*1*
n-Hexadecanoic acid	*319*	*N J*	*ug/Kg*		*10.99*	*57-10-3*	*12/04/18 15:56*	*12/10/18 11:13*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*67*		*47 - 125*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
2-Fluorobiphenyl (Surr)	*74*		*59 - 110*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
2-Fluorophenol (Surr)	*75*		*54 - 102*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Nitrobenzene-d5 (Surr)	*63*		*44 - 120*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Phenol-d5 (Surr)	*69*		*51 - 104*	*12/04/18 15:56*	*12/10/18 11:13*	*1*
Terphenyl-d14 (Surr)	*77*		*59 - 98*	*12/04/18 15:56*	*12/10/18 11:13*	*1*

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2310		ug/Kg		69	58 - 101
1,2-Dichlorobenzene	3330	2250		ug/Kg		68	57 - 99
1,3-Dichlorobenzene	3330	2170		ug/Kg		65	55 - 98
1,4-Dichlorobenzene	3330	2270		ug/Kg		68	56 - 98
2,4,5-Trichlorophenol	3330	2420		ug/Kg		73	56 - 109

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,6-Trichlorophenol	3330	2520		ug/Kg		76	56 - 110
2,4-Dichlorophenol	3330	2610		ug/Kg		78	57 - 99
2,4-Dimethylphenol	3330	2580		ug/Kg		77	53 - 97
2,4-Dinitrophenol	3330	2270		ug/Kg		68	10 - 89
2,4-Dinitrotoluene	3330	2680		ug/Kg		80	54 - 105
2,6-Dinitrotoluene	3330	2550		ug/Kg		77	55 - 105
2-Chloronaphthalene	3330	2510		ug/Kg		75	56 - 111
2-Chlorophenol	3330	2550		ug/Kg		77	56 - 99
2-Methylnaphthalene	3330	2590		ug/Kg		78	58 - 98
2-Methylphenol	3330	2550		ug/Kg		77	53 - 97
2-Nitroaniline	3330	2550		ug/Kg		77	55 - 108
2-Nitrophenol	3330	2480		ug/Kg		74	59 - 104
3 & 4 Methylphenol	3330	2920		ug/Kg		87	58 - 108
3,3'-Dichlorobenzidine	3330	2130		ug/Kg		64	42 - 104
3-Nitroaniline	3330	2400		ug/Kg		72	43 - 96
4,6-Dinitro-2-methylphenol	3330	2710		ug/Kg		81	19 - 102
4-Bromophenyl phenyl ether	3330	2510		ug/Kg		75	58 - 109
4-Chloro-3-methylphenol	3330	2660		ug/Kg		80	54 - 98
4-Chloroaniline	3330	1980		ug/Kg		60	41 - 83
4-Chlorophenyl phenyl ether	3330	2540		ug/Kg		76	55 - 105
4-Nitroaniline	3330	2750		ug/Kg		82	49 - 99
4-Nitrophenol	3330	2620		ug/Kg		79	48 - 106
Acenaphthene	3330	2600		ug/Kg		78	55 - 106
Acenaphthylene	3330	2540		ug/Kg		76	56 - 109
Anthracene	3330	2600		ug/Kg		78	56 - 103
Benzo[a]anthracene	3330	2620		ug/Kg		79	56 - 107
Benzo[a]pyrene	3330	2550		ug/Kg		76	57 - 109
Benzo[b]fluoranthene	3330	2580		ug/Kg		78	68 - 109
Benzo[g,h,i]perylene	3330	1740		ug/Kg		52	51 - 126
Benzo[k]fluoranthene	3330	2430		ug/Kg		73	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2290		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2420		ug/Kg		73	56 - 99
Bis(2-chloroethyl)ether	3330	2080		ug/Kg		62	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2860		ug/Kg		86	59 - 113
Butyl benzyl phthalate	3330	2730		ug/Kg		82	60 - 112
Carbazole	3330	2710		ug/Kg		81	53 - 98
Chrysene	3330	2640		ug/Kg		79	54 - 107
Dibenz(a,h)anthracene	3330	2060		ug/Kg		62	52 - 126
Dibenzofuran	3330	2550		ug/Kg		76	55 - 103
Diethylphthalate	3330	2680		ug/Kg		80	54 - 101
Di-n-butyl phthalate	3330	2740		ug/Kg		82	57 - 102
Di-n-octyl phthalate	3330	2980		ug/Kg		90	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3070		ug/Kg		92	63 - 121
Fluoranthene	3330	2680		ug/Kg		80	54 - 100
Fluorene	3330	2640		ug/Kg		79	57 - 106
Hexachlorobenzene	3330	2520		ug/Kg		76	57 - 109
Hexachlorobutadiene	3330	2440		ug/Kg		73	59 - 106

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404121/2-A
Matrix: Solid
Analysis Batch: 404808

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorocyclopentadiene	3330	2160		ug/Kg		65	44 - 140
Hexachloroethane	3330	2250		ug/Kg		68	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2360		ug/Kg		71	52 - 132
Isophorone	3330	2220		ug/Kg		67	55 - 96
Naphthalene	3330	2470		ug/Kg		74	57 - 98
Nitrobenzene	3330	2430		ug/Kg		73	58 - 102
N-Nitrosodi-n-propylamine	3330	2450		ug/Kg		74	54 - 98
Pentachlorophenol	3330	2370		ug/Kg		71	35 - 107
Phenanthrene	3330	2640		ug/Kg		79	57 - 103
Phenol	3330	2410		ug/Kg		72	50 - 96
Pyrene	3330	2640		ug/Kg		79	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*77*		*47 - 125*
2-Fluorobiphenyl (Surr)	*75*		*59 - 110*
2-Fluorophenol (Surr)	*75*		*54 - 102*
Nitrobenzene-d5 (Surr)	*73*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*80*		*59 - 98*

Lab Sample ID: 160-32078-10 MS
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3650	2600		ug/Kg	☼	71	52 - 103
1,2-Dichlorobenzene	38	U	3650	2630		ug/Kg	☼	72	50 - 98
1,3-Dichlorobenzene	40	U	3650	2510		ug/Kg	☼	69	49 - 96
1,4-Dichlorobenzene	41	U	3650	2650		ug/Kg	☼	73	50 - 96
2,4,5-Trichlorophenol	57	U	3650	2820		ug/Kg	☼	77	41 - 116
2,4,6-Trichlorophenol	50	U	3650	2930		ug/Kg	☼	80	40 - 115
2,4-Dichlorophenol	43	U	3650	2940		ug/Kg	☼	81	47 - 104
2,4-Dimethylphenol	60	U	3650	2940		ug/Kg	☼	81	45 - 105
2,4-Dinitrophenol	360	U	3650	2380		ug/Kg	☼	65	10 - 100
2,4-Dinitrotoluene	140	U	3650	2990		ug/Kg	☼	82	42 - 113
2,6-Dinitrotoluene	68	U	3650	2920		ug/Kg	☼	80	46 - 109
2-Chloronaphthalene	41	U	3650	2860		ug/Kg	☼	78	52 - 108
2-Chlorophenol	42	U	3650	2940		ug/Kg	☼	81	48 - 102
2-Methylnaphthalene	44	U	3650	2790		ug/Kg	☼	76	55 - 97
2-Methylphenol	46	U	3650	2900		ug/Kg	☼	79	46 - 98
2-Nitroaniline	130	U	3650	2850		ug/Kg	☼	78	45 - 111
2-Nitrophenol	160	U	3650	2790		ug/Kg	☼	76	38 - 115
3 & 4 Methylphenol	73	U	3650	3420		ug/Kg	☼	94	48 - 111
3,3'-Dichlorobenzidine	120	U	3650	2390		ug/Kg	☼	66	23 - 102
3-Nitroaniline	110	U	3650	2810		ug/Kg	☼	77	32 - 95
4,6-Dinitro-2-methylphenol	360	U	3650	2890		ug/Kg	☼	79	15 - 118
4-Bromophenyl phenyl ether	53	U	3650	2870		ug/Kg	☼	79	53 - 110
4-Chloro-3-methylphenol	46	U	3650	2940		ug/Kg	☼	81	36 - 111

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32078-10 MS
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chloroaniline	51	U	3650	2320		ug/Kg	☼	64	32 - 79
4-Chlorophenyl phenyl ether	47	U	3650	2900		ug/Kg	☼	80	51 - 103
4-Nitroaniline	81	U	3650	3000		ug/Kg	☼	82	36 - 102
4-Nitrophenol	360	U	3650	2890		ug/Kg	☼	79	40 - 113
Acenaphthene	38	U	3650	2930		ug/Kg	☼	80	53 - 105
Acenaphthylene	50	U	3650	2870		ug/Kg	☼	79	55 - 107
Anthracene	53	U	3650	3000		ug/Kg	☼	82	55 - 103
Benzo[a]anthracene	65	U	3650	3000		ug/Kg	☼	82	48 - 112
Benzo[a]pyrene	98	U	3650	2860		ug/Kg	☼	79	46 - 117
Benzo[b]fluoranthene	36	U	3650	2910		ug/Kg	☼	80	45 - 125
Benzo[g,h,i]perylene	36	U	3650	2090		ug/Kg	☼	57	24 - 134
Benzo[k]fluoranthene	87	U	3650	2770		ug/Kg	☼	76	43 - 114
bis(2 chloro-1-methylethyl) ether	46	U	3650	2600		ug/Kg	☼	71	38 - 98
Bis(2-chloroethoxy)methane	41	U	3650	2640		ug/Kg	☼	72	49 - 100
Bis(2-chloroethyl)ether	36	U	3650	2530		ug/Kg	☼	70	49 - 100
Bis(2-ethylhexyl) phthalate	93	U	3650	3190		ug/Kg	☼	87	50 - 113
Butyl benzyl phthalate	100	U	3650	3160		ug/Kg	☼	87	54 - 112
Carbazole	52	U	3650	3080		ug/Kg	☼	84	47 - 102
Chrysene	50	U	3650	2960		ug/Kg	☼	81	45 - 115
Dibenz(a,h)anthracene	72	U	3650	2600		ug/Kg	☼	71	30 - 134
Dibenzofuran	44	U	3650	2910		ug/Kg	☼	80	50 - 102
Diethylphthalate	89	U	3650	3140		ug/Kg	☼	86	46 - 107
Di-n-butyl phthalate	70	U	3650	3130		ug/Kg	☼	86	49 - 107
Di-n-octyl phthalate	140	U	3650	3400		ug/Kg	☼	93	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3650	3550		ug/Kg	☼	97	33 - 140
Fluoranthene	55	U	3650	3030		ug/Kg	☼	83	45 - 109
Fluorene	50	U	3650	2990		ug/Kg	☼	82	45 - 109
Hexachlorobenzene	46	U	3650	2920		ug/Kg	☼	80	48 - 113
Hexachlorobutadiene	44	U	3650	2750		ug/Kg	☼	76	48 - 109
Hexachlorocyclopentadiene	360	U	3650	2340		ug/Kg	☼	64	21 - 144
Hexachloroethane	38	U	3650	2580		ug/Kg	☼	71	44 - 102
Indeno[1,2,3-cd]pyrene	69	U	3650	2530		ug/Kg	☼	69	30 - 136
Isophorone	41	U	3650	2430		ug/Kg	☼	67	48 - 100
Naphthalene	39	U	3650	2790		ug/Kg	☼	76	54 - 98
Nitrobenzene	44	U	3650	2710		ug/Kg	☼	74	51 - 106
N-Nitrosodi-n-propylamine	44	U	3650	2780		ug/Kg	☼	76	47 - 104
Pentachlorophenol	360	U	3650	2620		ug/Kg	☼	72	23 - 116
Phenanthrene	46	U	3650	3010		ug/Kg	☼	83	53 - 106
Phenol	41	U	3650	2790		ug/Kg	☼	76	41 - 100
Pyrene	80	U	3650	2970		ug/Kg	☼	82	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*76*		*47 - 125*
2-Fluorobiphenyl (Surr)	*80*		*59 - 110*
2-Fluorophenol (Surr)	*82*		*54 - 102*
Nitrobenzene-d5 (Surr)	*73*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32078-10 MS
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*84*		*59 - 98*

Lab Sample ID: 160-32078-10 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3650	2530		ug/Kg	☼	69	52 - 103	3	30
1,2-Dichlorobenzene	38	U	3650	2430		ug/Kg	☼	67	50 - 98	8	30
1,3-Dichlorobenzene	40	U	3650	2420		ug/Kg	☼	66	49 - 96	3	30
1,4-Dichlorobenzene	41	U	3650	2460		ug/Kg	☼	67	50 - 96	7	30
2,4,5-Trichlorophenol	57	U	3650	2660		ug/Kg	☼	73	41 - 116	6	30
2,4,6-Trichlorophenol	50	U	3650	2940		ug/Kg	☼	81	40 - 115	0	30
2,4-Dichlorophenol	43	U	3650	2900		ug/Kg	☼	79	47 - 104	1	30
2,4-Dimethylphenol	60	U	3650	2810		ug/Kg	☼	77	45 - 105	5	30
2,4-Dinitrophenol	360	U	3650	2310		ug/Kg	☼	63	10 - 100	3	30
2,4-Dinitrotoluene	140	U	3650	2920		ug/Kg	☼	80	42 - 113	2	30
2,6-Dinitrotoluene	68	U	3650	2830		ug/Kg	☼	78	46 - 109	3	30
2-Chloronaphthalene	41	U	3650	2710		ug/Kg	☼	74	52 - 108	5	30
2-Chlorophenol	42	U	3650	2760		ug/Kg	☼	76	48 - 102	6	30
2-Methylnaphthalene	44	U	3650	2710		ug/Kg	☼	74	55 - 97	3	30
2-Methylphenol	46	U	3650	2840		ug/Kg	☼	78	46 - 98	2	30
2-Nitroaniline	130	U	3650	2640		ug/Kg	☼	72	45 - 111	8	30
2-Nitrophenol	160	U	3650	2610		ug/Kg	☼	72	38 - 115	7	30
3 & 4 Methylphenol	73	U	3650	3180		ug/Kg	☼	87	48 - 111	7	30
3,3'-Dichlorobenzidine	120	U	3650	2340		ug/Kg	☼	64	23 - 102	2	30
3-Nitroaniline	110	U	3650	2560		ug/Kg	☼	70	32 - 95	9	30
4,6-Dinitro-2-methylphenol	360	U	3650	2850		ug/Kg	☼	78	15 - 118	1	30
4-Bromophenyl phenyl ether	53	U	3650	2940		ug/Kg	☼	81	53 - 110	2	30
4-Chloro-3-methylphenol	46	U	3650	2840		ug/Kg	☼	78	36 - 111	3	30
4-Chloroaniline	51	U	3650	2130		ug/Kg	☼	58	32 - 79	9	30
4-Chlorophenyl phenyl ether	47	U	3650	2930		ug/Kg	☼	80	51 - 103	1	30
4-Nitroaniline	81	U	3650	2890		ug/Kg	☼	79	36 - 102	4	30
4-Nitrophenol	360	U	3650	2840		ug/Kg	☼	78	40 - 113	2	30
Acenaphthene	38	U	3650	2840		ug/Kg	☼	78	53 - 105	3	30
Acenaphthylene	50	U	3650	2740		ug/Kg	☼	75	55 - 107	4	30
Anthracene	53	U	3650	2970		ug/Kg	☼	81	55 - 103	1	30
Benzo[a]anthracene	65	U	3650	3000		ug/Kg	☼	82	48 - 112	0	30
Benzo[a]pyrene	98	U	3650	2910		ug/Kg	☼	80	46 - 117	2	30
Benzo[b]fluoranthene	36	U	3650	2940		ug/Kg	☼	81	45 - 125	1	30
Benzo[g,h,i]perylene	36	U	3650	1920		ug/Kg	☼	53	24 - 134	8	30
Benzo[k]fluoranthene	87	U	3650	2900		ug/Kg	☼	79	43 - 114	4	30
bis(2 chloro-1-methylethyl) ether	46	U	3650	2320		ug/Kg	☼	64	38 - 98	11	30
Bis(2-chloroethoxy)methane	41	U	3650	2510		ug/Kg	☼	69	49 - 100	5	30
Bis(2-chloroethyl)ether	36	U	3650	2240		ug/Kg	☼	61	49 - 100	12	30
Bis(2-ethylhexyl) phthalate	93	U	3650	3200		ug/Kg	☼	88	50 - 113	0	30
Butyl benzyl phthalate	100	U	3650	3120		ug/Kg	☼	86	54 - 112	1	30
Carbazole	52	U	3650	3030		ug/Kg	☼	83	47 - 102	1	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32078-10 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chrysene	50	U	3650	3030		ug/Kg	☼	83	45 - 115	2	30
Dibenz(a,h)anthracene	72	U	3650	2350		ug/Kg	☼	64	30 - 134	10	30
Dibenzofuran	44	U	3650	2820		ug/Kg	☼	77	50 - 102	3	30
Diethylphthalate	89	U	3650	3000		ug/Kg	☼	82	46 - 107	5	30
Di-n-butyl phthalate	70	U	3650	3090		ug/Kg	☼	85	49 - 107	1	30
Di-n-octyl phthalate	140	U	3650	3370		ug/Kg	☼	92	35 - 125	1	30
Diphenylamine + N-Nitrosodiphenylamine	36	U	3650	3430		ug/Kg	☼	94	33 - 140	3	30
Fluoranthene	55	U	3650	3040		ug/Kg	☼	83	45 - 109	0	30
Fluorene	50	U	3650	2890		ug/Kg	☼	79	45 - 109	4	30
Hexachlorobenzene	46	U	3650	2940		ug/Kg	☼	81	48 - 113	1	30
Hexachlorobutadiene	44	U	3650	2690		ug/Kg	☼	74	48 - 109	2	30
Hexachlorocyclopentadiene	360	U	3650	2340		ug/Kg	☼	64	21 - 144	0	30
Hexachloroethane	38	U	3650	2300		ug/Kg	☼	63	44 - 102	11	30
Indeno[1,2,3-cd]pyrene	69	U	3650	2330		ug/Kg	☼	64	30 - 136	8	30
Isophorone	41	U	3650	2340		ug/Kg	☼	64	48 - 100	4	30
Naphthalene	39	U	3650	2630		ug/Kg	☼	72	54 - 98	6	30
Nitrobenzene	44	U	3650	2470		ug/Kg	☼	68	51 - 106	9	30
N-Nitrosodi-n-propylamine	44	U	3650	2590		ug/Kg	☼	71	47 - 104	7	30
Pentachlorophenol	360	U	3650	2650		ug/Kg	☼	73	23 - 116	1	30
Phenanthrene	46	U	3650	2940		ug/Kg	☼	81	53 - 106	2	30
Phenol	41	U	3650	2560		ug/Kg	☼	70	41 - 100	8	30
Pyrene	80	U	3650	3040		ug/Kg	☼	83	39 - 130	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*
Phenol-d5 (Surr)	*74*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404015/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/04/18 14:13	12/09/18 23:21	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32078-10	B3M451	109	101	105	101
160-32078-11	B3M463	106	101	106	100
160-32078-12	B3M459	107	101	104	102
160-32078-13	B3M455	104	100	105	102
160-32078-14	B3M435	107	102	105	102
160-32078-15	B3M471	112	99	109	100
160-32078-16	B3M439	114	104	105	103
160-32078-17	B3M467	111	99	106	102
160-32078-18	B3M419	111	100	105	101
160-32078-18 MS	B3M419	101	92	95	97
160-32078-18 MSD	B3M419	100	100	96	101
160-32078-19	B3M478	114	101	111	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-405738/5	Lab Control Sample	94	93	97	97
LCSD 160-405738/6	Lab Control Sample Dup	94	96	99	100
MB 160-405738/8	Method Blank	97	96	103	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32078-10	B3M451	70	79	82	65	74	86
160-32078-10 MS	B3M451	76	80	82	73	76	84
160-32078-10 MSD	B3M451	82	77	77	67	74	86
160-32078-11	B3M463	74	82	81	67	75	83
160-32078-12	B3M459	76	81	78	64	72	82
160-32078-13 - DL	B3M455	67	80	77	59	71	86
160-32078-14 - DL	B3M435	67	78	72	59	69	85
160-32078-15	B3M471	79	78	79	64	72	79
160-32078-16	B3M439	76	76	80	62	71	77

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32078-17	B3M467	74	75	77	61	72	80
160-32078-18	B3M419	77	79	82	62	75	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404121/2-A	Lab Control Sample	77	75	75	73	73	80
MB 160-404121/1-A	Method Blank	67	74	75	63	69	77

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32078-1	B3M454	95	92
160-32078-1 MS	B3M454	96	92
160-32078-1 MSD	B3M454	95	92
160-32078-2	B3M470	102	93
160-32078-3	B3M450	99	93
160-32078-4	B3M462	96	88
160-32078-5	B3M458	95	86
160-32078-6	B3M466	93	88
160-32078-7	B3M438	94	93
160-32078-8	B3M434	109	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32124-2 MSD
Matrix: Soil
Analysis Batch: 406161

Client Sample ID: B3M431
Prep Type: Total/NA
Prep Batch: 406172

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	3.5	U	65.0	52.0		ug/Kg	☼	80	62 - 118	18	20
4-Methyl-2-pentanone (MIBK)	2.6	U	65.0	56.3		ug/Kg	☼	87	73 - 125	18	20
Acetone	6.7	U	65.0	62.2		ug/Kg	☼	96	54 - 139	10	20
Benzene	0.27	U	65.0	66.7		ug/Kg	☼	103	80 - 120	13	20
Bromodichloromethane	0.51	U	65.0	64.0		ug/Kg	☼	98	80 - 120	14	20
Bromoform	2.0	U	65.0	67.5		ug/Kg	☼	104	80 - 125	17	20
Bromomethane	2.4	U	65.0	53.3		ug/Kg	☼	82	70 - 126	15	20
Carbon disulfide	0.71	U	65.0	69.3		ug/Kg	☼	107	79 - 121	16	20
Carbon tetrachloride	0.53	U	65.0	61.2		ug/Kg	☼	94	80 - 120	15	20
Chlorobenzene	0.84	U	65.0	66.3		ug/Kg	☼	102	80 - 120	15	20
Chloroethane	2.0	U o	65.0	44.5		ug/Kg	☼	68	64 - 133	14	20
Chloroform	0.39	U	65.0	61.2		ug/Kg	☼	94	80 - 120	15	20
Chloromethane	0.67	U	65.0	57.5		ug/Kg	☼	88	75 - 120	15	20
cis-1,3-Dichloropropene	2.2	U	65.0	73.4		ug/Kg	☼	113	80 - 120	12	20
Dibromochloromethane	1.3	U	65.0	68.3		ug/Kg	☼	105	80 - 120	16	20
Ethylbenzene	0.71	U	65.0	64.4		ug/Kg	☼	99	80 - 120	16	20
Methylene Chloride	1.6	U	65.0	69.3		ug/Kg	☼	107	77 - 123	13	20
Styrene	2.0	U	65.0	72.8		ug/Kg	☼	112	80 - 120	16	20
Tetrachloroethene	0.58	U	65.0	63.3		ug/Kg	☼	97	80 - 120	12	20
Toluene	2.6	U	65.0	72.9		ug/Kg	☼	112	80 - 124	17	20
trans-1,3-Dichloropropene	1.8	U	65.0	68.8		ug/Kg	☼	106	80 - 122	17	20
Trichloroethene	0.40	U T	65.0	78.5	T y	ug/Kg	☼	121	79 - 120	21	20
Vinyl chloride	0.44	U	65.0	52.2		ug/Kg	☼	80	71 - 120	16	20
Xylenes, Total	0.88	U	130	143		ug/Kg	☼	110	80 - 120	14	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*67 - 132*
4-Bromofluorobenzene (Surr)	*99*		*59 - 150*
Dibromofluoromethane (Surr)	*90*		*53 - 143*
Toluene-d8 (Surr)	*101*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Methylphenol	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
2-Picoline	45	U	660	45	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acenaphthene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acenaphthylene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Acetophenone	34	U	330	34	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Aniline	60	U	330	60	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Anthracene	49	U	330	49	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Aramite	330	U	660	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Carbazole	47	U	330	47	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Chrysene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diallate	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dibenzofuran	41	U	330	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diethylphthalate	82	U	330	82	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dimethoate	100	U	660	100	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Dinoseb	330	U	660	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Disulfoton	41	U	1600	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Famphur	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Fluoranthene	50	U	330	50	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Fluorene	46	U	330	46	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachloroethane	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isodrin	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isophorone	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Isosafrole	67	U	660	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Kepone	330	U	3300	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methapyrilene	140	U	1600	140	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Methyl parathion	120	U	1600	120	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Naphthalene	35	U	330	35	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Nitrobenzene	40	U	330	40	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-404561/1-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404561

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Parathion	98	U	1600	98	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenacetin	54	U	660	54	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenanthrene	42	U	330	42	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phenol	38	U	330	38	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Phorate	37	U	1600	37	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pronamide	53	U	660	53	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pyrene	73	U	330	73	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Pyridine	71	U	660	71	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Safrole	33	U	660	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/07/18 11:05	12/13/18 10:45	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/07/18 11:05	12/13/18 10:45	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*12/07/18 11:05*	*12/13/18 10:45*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*61*		*47 - 125*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
2-Fluorobiphenyl (Surr)	*74*		*59 - 110*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
2-Fluorophenol (Surr)	*71*		*54 - 102*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Nitrobenzene-d5 (Surr)	*60*		*44 - 120*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Phenol-d5 (Surr)	*64*		*51 - 104*	*12/07/18 11:05*	*12/13/18 10:45*	*1*
Terphenyl-d14 (Surr)	*79*		*59 - 98*	*12/07/18 11:05*	*12/13/18 10:45*	*1*

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2470		ug/Kg		74	58 - 101
1,2-Dichlorobenzene	3330	2330		ug/Kg		70	57 - 99
1,3-Dichlorobenzene	3330	2370		ug/Kg		71	55 - 98
1,4-Dichlorobenzene	3330	2330		ug/Kg		70	56 - 98
2,4,5-Trichlorophenol	3330	2740		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2830		ug/Kg		85	56 - 110
2,4-Dichlorophenol	3330	2750		ug/Kg		83	57 - 99
2,4-Dimethylphenol	3330	2570		ug/Kg		77	53 - 97
2,4-Dinitrophenol	3330	2580		ug/Kg		77	10 - 89
2,4-Dinitrotoluene	3330	2770		ug/Kg		83	54 - 105
2,6-Dinitrotoluene	3330	2660		ug/Kg		80	55 - 105

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloronaphthalene	3330	2750		ug/Kg		83	56 - 111
2-Chlorophenol	3330	2520		ug/Kg		76	56 - 99
2-Methylnaphthalene	3330	2630		ug/Kg		79	58 - 98
2-Methylphenol	3330	2490		ug/Kg		75	53 - 97
2-Nitroaniline	3330	2500		ug/Kg		75	55 - 108
2-Nitrophenol	3330	2620		ug/Kg		79	59 - 104
3 & 4 Methylphenol	3330	2830		ug/Kg		85	58 - 108
3,3'-Dichlorobenzidine	3330	2230		ug/Kg		67	42 - 104
3-Nitroaniline	3330	2370		ug/Kg		71	43 - 96
4,6-Dinitro-2-methylphenol	3330	3010		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2810		ug/Kg		84	58 - 109
4-Chloro-3-methylphenol	3330	2630		ug/Kg		79	54 - 98
4-Chloroaniline	3330	1960		ug/Kg		59	41 - 83
4-Chlorophenyl phenyl ether	3330	2820		ug/Kg		84	55 - 105
4-Nitroaniline	3330	2660		ug/Kg		80	49 - 99
4-Nitrophenol	3330	2650		ug/Kg		79	48 - 106
Acenaphthene	3330	2730		ug/Kg		82	55 - 106
Acenaphthylene	3330	2720		ug/Kg		82	56 - 109
Anthracene	3330	2840		ug/Kg		85	56 - 103
Benzo[a]anthracene	3330	2870		ug/Kg		86	56 - 107
Benzo[a]pyrene	3330	2720		ug/Kg		82	57 - 109
Benzo[b]fluoranthene	3330	2690		ug/Kg		81	68 - 109
Benzo[g,h,i]perylene	3330	3360		ug/Kg		101	51 - 126
Benzo[k]fluoranthene	3330	2570		ug/Kg		77	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2160		ug/Kg		65	49 - 94
Bis(2-chloroethoxy)methane	3330	2410		ug/Kg		72	56 - 99
Bis(2-chloroethyl)ether	3330	2020		ug/Kg		61	53 - 99
Bis(2-ethylhexyl) phthalate	3330	2940		ug/Kg		88	59 - 113
Butyl benzyl phthalate	3330	2920		ug/Kg		88	60 - 112
Carbazole	3330	2810		ug/Kg		84	53 - 98
Chrysene	3330	2870		ug/Kg		86	54 - 107
Dibenz(a,h)anthracene	3330	3590		ug/Kg		108	52 - 126
Dibenzofuran	3330	2740		ug/Kg		82	55 - 103
Diethylphthalate	3330	2810		ug/Kg		84	54 - 101
Di-n-butyl phthalate	3330	2780		ug/Kg		83	57 - 102
Di-n-octyl phthalate	3330	3040		ug/Kg		91	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3370		ug/Kg		101	63 - 121
Fluoranthene	3330	2730		ug/Kg		82	54 - 100
Fluorene	3330	2780		ug/Kg		83	57 - 106
Hexachlorobenzene	3330	2860		ug/Kg		86	57 - 109
Hexachlorobutadiene	3330	2600		ug/Kg		78	59 - 106
Hexachlorocyclopentadiene	3330	2550		ug/Kg		77	44 - 140
Hexachloroethane	3330	2270		ug/Kg		68	56 - 102
Indeno[1,2,3-cd]pyrene	3330	3620		ug/Kg		109	52 - 132
Isophorone	3330	2170		ug/Kg		65	55 - 96
Naphthalene	3330	2520		ug/Kg		76	57 - 98
Nitrobenzene	3330	2430		ug/Kg		73	58 - 102

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-404561/2-A
Matrix: Solid
Analysis Batch: 405480

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-Nitrosodi-n-propylamine	3330	2320		ug/Kg		70	54 - 98
Pentachlorophenol	3330	2650		ug/Kg		80	35 - 107
Phenanthrene	3330	2840		ug/Kg		85	57 - 103
Phenol	3330	2320		ug/Kg		69	50 - 96
Pyrene	3330	3020		ug/Kg		91	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*73*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Lab Sample ID: 160-32124-1 MS
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3M423
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	36	U	3580	2710		ug/Kg	☼	76	52 - 103
1,2-Dichlorobenzene	38	U	3580	2630		ug/Kg	☼	73	50 - 98
1,3-Dichlorobenzene	39	U	3580	2510		ug/Kg	☼	70	49 - 96
1,4-Dichlorobenzene	40	U	3580	2640		ug/Kg	☼	74	50 - 96
2,4,5-Trichlorophenol	56	U	3580	2880		ug/Kg	☼	80	41 - 116
2,4,6-Trichlorophenol	49	U	3580	2970		ug/Kg	☼	83	40 - 115
2,4-Dichlorophenol	42	U	3580	2990		ug/Kg	☼	84	47 - 104
2,4-Dimethylphenol	59	U	3580	2890		ug/Kg	☼	81	45 - 105
2,4-Dinitrophenol	350	U	3580	2400		ug/Kg	☼	67	10 - 100
2,4-Dinitrotoluene	140	U	3580	2980		ug/Kg	☼	83	42 - 113
2,6-Dinitrotoluene	67	U	3580	2990		ug/Kg	☼	83	46 - 109
2-Chloronaphthalene	40	U	3580	2970		ug/Kg	☼	83	52 - 108
2-Chlorophenol	41	U	3580	2860		ug/Kg	☼	80	48 - 102
2-Methylnaphthalene	43	U	3580	2900		ug/Kg	☼	81	55 - 97
2-Methylphenol	45	U	3580	2830		ug/Kg	☼	79	46 - 98
2-Nitroaniline	130	U	3580	2740		ug/Kg	☼	76	45 - 111
2-Nitrophenol	150	U	3580	2840		ug/Kg	☼	79	38 - 115
3 & 4 Methylphenol	71	U	3580	3210		ug/Kg	☼	90	48 - 111
3,3'-Dichlorobenzidine	120	U	3580	2530		ug/Kg	☼	71	23 - 102
3-Nitroaniline	110	U	3580	2590		ug/Kg	☼	72	32 - 95
4,6-Dinitro-2-methylphenol	350	U	3580	3140		ug/Kg	☼	88	15 - 118
4-Bromophenyl phenyl ether	52	U	3580	3160		ug/Kg	☼	88	53 - 110
4-Chloro-3-methylphenol	45	U	3580	2970		ug/Kg	☼	83	36 - 111
4-Chloroaniline	50	U	3580	2200		ug/Kg	☼	62	32 - 79
4-Chlorophenyl phenyl ether	46	U	3580	3010		ug/Kg	☼	84	51 - 103
4-Nitroaniline	80	U	3580	2850		ug/Kg	☼	80	36 - 102
4-Nitrophenol	350	U	3580	2750		ug/Kg	☼	77	40 - 113
Acenaphthene	37	U	3580	2980		ug/Kg	☼	83	53 - 105
Acenaphthylene	49	U	3580	2920		ug/Kg	☼	82	55 - 107

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-1 MS
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3M423
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Anthracene	53	U	3580	3100		ug/Kg	☼	87	55 - 103
Benzo[a]anthracene	64	U	3580	3150		ug/Kg	☼	88	48 - 112
Benzo[a]pyrene	96	U	3580	3080		ug/Kg	☼	86	46 - 117
Benzo[b]fluoranthene	36	U	3580	3030		ug/Kg	☼	85	45 - 125
Benzo[g,h,i]perylene	36	U	3580	4120		ug/Kg	☼	115	24 - 134
Benzo[k]fluoranthene	86	U	3580	2930		ug/Kg	☼	82	43 - 114
bis(2 chloro-1-methylethyl) ether	45	U	3580	2490		ug/Kg	☼	70	38 - 98
Bis(2-chloroethoxy)methane	40	U	3580	2700		ug/Kg	☼	75	49 - 100
Bis(2-chloroethyl)ether	36	U	3580	2340		ug/Kg	☼	65	49 - 100
Bis(2-ethylhexyl) phthalate	91	U	3580	3300		ug/Kg	☼	92	50 - 113
Butyl benzyl phthalate	99	U	3580	3260		ug/Kg	☼	91	54 - 112
Carbazole	51	U	3580	3090		ug/Kg	☼	86	47 - 102
Chrysene	49	U	3580	3160		ug/Kg	☼	88	45 - 115
Dibenz(a,h)anthracene	71	U	3580	3960		ug/Kg	☼	111	30 - 134
Dibenzofuran	44	U	3580	2960		ug/Kg	☼	83	50 - 102
Diethylphthalate	88	U	3580	3090		ug/Kg	☼	86	46 - 107
Di-n-butyl phthalate	69	U	3580	3170		ug/Kg	☼	88	49 - 107
Di-n-octyl phthalate	140	U	3580	3640		ug/Kg	☼	102	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3700		ug/Kg	☼	103	33 - 140
Fluoranthene	54	U	3580	3070		ug/Kg	☼	86	45 - 109
Fluorene	49	U	3580	3030		ug/Kg	☼	85	45 - 109
Hexachlorobenzene	45	U	3580	3170		ug/Kg	☼	89	48 - 113
Hexachlorobutadiene	43	U	3580	2930		ug/Kg	☼	82	48 - 109
Hexachlorocyclopentadiene	350	U	3580	2520		ug/Kg	☼	71	21 - 144
Hexachloroethane	37	U	3580	2500		ug/Kg	☼	70	44 - 102
Indeno[1,2,3-cd]pyrene	68	U	3580	4030		ug/Kg	☼	113	30 - 136
Isophorone	40	U	3580	2430		ug/Kg	☼	68	48 - 100
Naphthalene	38	U	3580	2810		ug/Kg	☼	79	54 - 98
Nitrobenzene	43	U	3580	2630		ug/Kg	☼	74	51 - 106
N-Nitrosodi-n-propylamine	43	U	3580	2670		ug/Kg	☼	75	47 - 104
Pentachlorophenol	350	U	3580	2640		ug/Kg	☼	74	23 - 116
Phenanthrene	45	U	3580	3050		ug/Kg	☼	85	53 - 106
Phenol	40	U	3580	2680		ug/Kg	☼	75	41 - 100
Pyrene	78	U	3580	3180		ug/Kg	☼	89	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*85*		*59 - 110*
2-Fluorophenol (Surr)	*79*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*75*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-1 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3M423
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	36	U	3580	2730		ug/Kg	☼	76	52 - 103	1	30
1,2-Dichlorobenzene	38	U	3580	2590		ug/Kg	☼	72	50 - 98	1	30
1,3-Dichlorobenzene	39	U	3580	2570		ug/Kg	☼	72	49 - 96	3	30
1,4-Dichlorobenzene	40	U	3580	2590		ug/Kg	☼	72	50 - 96	2	30
2,4,5-Trichlorophenol	56	U	3580	2960		ug/Kg	☼	83	41 - 116	3	30
2,4,6-Trichlorophenol	49	U	3580	2990		ug/Kg	☼	83	40 - 115	1	30
2,4-Dichlorophenol	42	U	3580	3170		ug/Kg	☼	88	47 - 104	6	30
2,4-Dimethylphenol	59	U	3580	2960		ug/Kg	☼	83	45 - 105	2	30
2,4-Dinitrophenol	350	U	3580	2530		ug/Kg	☼	71	10 - 100	5	30
2,4-Dinitrotoluene	140	U	3580	2910		ug/Kg	☼	81	42 - 113	2	30
2,6-Dinitrotoluene	67	U	3580	2920		ug/Kg	☼	82	46 - 109	2	30
2-Chloronaphthalene	40	U	3580	3060		ug/Kg	☼	85	52 - 108	3	30
2-Chlorophenol	41	U	3580	2890		ug/Kg	☼	81	48 - 102	1	30
2-Methylnaphthalene	43	U	3580	2980		ug/Kg	☼	83	55 - 97	3	30
2-Methylphenol	45	U	3580	2870		ug/Kg	☼	80	46 - 98	1	30
2-Nitroaniline	130	U	3580	2790		ug/Kg	☼	78	45 - 111	2	30
2-Nitrophenol	150	U	3580	2900		ug/Kg	☼	81	38 - 115	2	30
3 & 4 Methylphenol	71	U	3580	3340		ug/Kg	☼	93	48 - 111	4	30
3,3'-Dichlorobenzidine	120	U	3580	2460		ug/Kg	☼	69	23 - 102	3	30
3-Nitroaniline	110	U	3580	2640		ug/Kg	☼	74	32 - 95	2	30
4,6-Dinitro-2-methylphenol	350	U	3580	3160		ug/Kg	☼	88	15 - 118	0	30
4-Bromophenyl phenyl ether	52	U	3580	3110		ug/Kg	☼	87	53 - 110	2	30
4-Chloro-3-methylphenol	45	U	3580	2950		ug/Kg	☼	82	36 - 111	1	30
4-Chloroaniline	50	U	3580	2360		ug/Kg	☼	66	32 - 79	7	30
4-Chlorophenyl phenyl ether	46	U	3580	2960		ug/Kg	☼	83	51 - 103	2	30
4-Nitroaniline	80	U	3580	2900		ug/Kg	☼	81	36 - 102	2	30
4-Nitrophenol	350	U	3580	2860		ug/Kg	☼	80	40 - 113	4	30
Acenaphthene	37	U	3580	3020		ug/Kg	☼	84	53 - 105	1	30
Acenaphthylene	49	U	3580	2960		ug/Kg	☼	83	55 - 107	1	30
Anthracene	53	U	3580	3070		ug/Kg	☼	86	55 - 103	1	30
Benzo[a]anthracene	64	U	3580	3010		ug/Kg	☼	84	48 - 112	5	30
Benzo[a]pyrene	96	U	3580	2930		ug/Kg	☼	82	46 - 117	5	30
Benzo[b]fluoranthene	36	U	3580	2890		ug/Kg	☼	81	45 - 125	5	30
Benzo[g,h,i]perylene	36	U	3580	3890		ug/Kg	☼	109	24 - 134	6	30
Benzo[k]fluoranthene	86	U	3580	2740		ug/Kg	☼	77	43 - 114	7	30
bis(2 chloro-1-methylethyl) ether	45	U	3580	2430		ug/Kg	☼	68	38 - 98	3	30
Bis(2-chloroethoxy)methane	40	U	3580	2690		ug/Kg	☼	75	49 - 100	0	30
Bis(2-chloroethyl)ether	36	U	3580	2360		ug/Kg	☼	66	49 - 100	1	30
Bis(2-ethylhexyl) phthalate	91	U	3580	3160		ug/Kg	☼	88	50 - 113	4	30
Butyl benzyl phthalate	99	U	3580	3050		ug/Kg	☼	85	54 - 112	7	30
Carbazole	51	U	3580	3070		ug/Kg	☼	86	47 - 102	1	30
Chrysene	49	U	3580	3000		ug/Kg	☼	84	45 - 115	5	30
Dibenz(a,h)anthracene	71	U	3580	3670		ug/Kg	☼	103	30 - 134	7	30
Dibenzofuran	44	U	3580	2980		ug/Kg	☼	83	50 - 102	1	30
Diethylphthalate	88	U	3580	3080		ug/Kg	☼	86	46 - 107	0	30
Di-n-butyl phthalate	69	U	3580	3150		ug/Kg	☼	88	49 - 107	1	30
Di-n-octyl phthalate	140	U	3580	3430		ug/Kg	☼	96	35 - 125	6	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-1 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3M423
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3640		ug/Kg	☼	102	33 - 140	2	30
Fluoranthene	54	U	3580	3050		ug/Kg	☼	85	45 - 109	0	30
Fluorene	49	U	3580	2970		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3580	3090		ug/Kg	☼	86	48 - 113	3	30
Hexachlorobutadiene	43	U	3580	2980		ug/Kg	☼	83	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3580	2580		ug/Kg	☼	72	21 - 144	2	30
Hexachloroethane	37	U	3580	2590		ug/Kg	☼	72	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	68	U	3580	3760		ug/Kg	☼	105	30 - 136	7	30
Isophorone	40	U	3580	2470		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	38	U	3580	2880		ug/Kg	☼	80	54 - 98	2	30
Nitrobenzene	43	U	3580	2740		ug/Kg	☼	76	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3580	2680		ug/Kg	☼	75	47 - 104	0	30
Pentachlorophenol	350	U	3580	2750		ug/Kg	☼	77	23 - 116	4	30
Phenanthrene	45	U	3580	3080		ug/Kg	☼	86	53 - 106	1	30
Phenol	40	U	3580	2660		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3580	3010		ug/Kg	☼	84	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*76*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404463/1-A
Matrix: Solid
Analysis Batch: 407098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404463

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32124-1
SDG: SL32124-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32124-1	B3M423	92	99	96	99
160-32124-2	B3M431	91	100	92	98
160-32124-2 MS	B3M431	87	99	93	100
160-32124-2 MSD	B3M431	84	99	90	101
160-32124-3	B3M443	94	100	95	98
160-32124-4	B3M447	95	100	94	98
160-32124-5	B3M427	95	97	96	99
160-32124-6	B3M415	100	99	97	100
160-32124-7	B3M480	97	95	100	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406161/5	Lab Control Sample	86	96	96	99
LCSD 160-406161/6	Lab Control Sample Dup	84	96	98	100
MB 160-406161/8	Method Blank	87	96	98	98

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32124-1	B3M423	74	83	79	66	74	86
160-32124-1 MS	B3M423	82	85	79	75	75	91
160-32124-1 MSD	B3M423	86	87	84	76	76	86
160-32124-2	B3M431	73	83	82	67	73	85
160-32124-3	B3M443	80	86	82	69	77	89
160-32124-4	B3M447	74	85	84	69	75	84
160-32124-5	B3M427	77	82	84	68	78	82
160-32124-6	B3M415	75	87	82	70	73	84

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)

2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404561/2-A	Lab Control Sample	82	85	77	74	73	91
MB 160-404561/1-A	Method Blank	61	74	71	60	64	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32124-8	B3M442	88	82
160-32124-8 MS	B3M442	81	76
160-32124-8 MSD	B3M442	88	80
160-32124-9	B3M430	89	80
160-32124-10	B3M446	80	78
160-32124-11	B3M414	83	79
160-32124-12	B3M422	93	86
160-32124-13	B3M426	85	78

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404463/2-A	Lab Control Sample	80	80
MB 160-404463/1-A	Method Blank	84	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 160-32192-2 MSD
Matrix: Soil
Analysis Batch: 406531

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 406604

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	4.2	U	55.8	50.1		ug/Kg	☼	90	62 - 118	6	20
4-Methyl-2-pentanone (MIBK)	3.1	U	55.8	48.9		ug/Kg	☼	88	73 - 125	10	20
Acetone	8.0	U	55.8	45.0		ug/Kg	☼	81	54 - 139	4	20
Benzene	0.32	U	55.8	58.9		ug/Kg	☼	105	80 - 120	8	20
Bromodichloromethane	0.61	U	55.8	55.7		ug/Kg	☼	100	80 - 120	3	20
Bromoform	2.4	U	55.8	58.7		ug/Kg	☼	105	80 - 125	6	20
Bromomethane	2.9	U	55.8	46.5		ug/Kg	☼	83	70 - 126	9	20
Carbon disulfide	0.85	U	55.8	54.7		ug/Kg	☼	98	79 - 121	6	20
Carbon tetrachloride	0.63	U	55.8	52.5		ug/Kg	☼	94	80 - 120	8	20
Chlorobenzene	1.0	U	55.8	57.2		ug/Kg	☼	102	80 - 120	6	20
Chloroethane	2.4	U o	55.8	37.9		ug/Kg	☼	68	64 - 133	8	20
Chloroform	0.47	U	55.8	53.1		ug/Kg	☼	95	80 - 120	7	20
Chloromethane	0.80	U	55.8	48.6		ug/Kg	☼	87	75 - 120	9	20
cis-1,3-Dichloropropene	2.6	U	55.8	61.5		ug/Kg	☼	110	80 - 120	6	20
Dibromochloromethane	1.5	U	55.8	57.2		ug/Kg	☼	102	80 - 120	4	20
Ethylbenzene	0.85	U	55.8	56.1		ug/Kg	☼	101	80 - 120	7	20
Methylene Chloride	2.0	U	55.8	61.3		ug/Kg	☼	110	77 - 123	10	20
Styrene	2.4	U	55.8	62.6		ug/Kg	☼	112	80 - 120	6	20
Tetrachloroethene	0.70	U	55.8	55.5		ug/Kg	☼	99	80 - 120	7	20
Toluene	3.1	U	55.8	61.8		ug/Kg	☼	111	80 - 124	6	20
trans-1,3-Dichloropropene	2.2	U	55.8	56.1		ug/Kg	☼	100	80 - 122	5	20
Trichloroethene	0.48	U	55.8	60.4		ug/Kg	☼	108	79 - 120	7	20
Vinyl chloride	0.53	U	55.8	43.7		ug/Kg	☼	78	71 - 120	7	20
Xylenes, Total	1.1	U	112	125		ug/Kg	☼	112	80 - 120	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*67 - 132*
4-Bromofluorobenzene (Surr)	*103*		*59 - 150*
Dibromofluoromethane (Surr)	*101*		*53 - 143*
Toluene-d8 (Surr)	*105*		*74 - 135*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4,5-Tetrachlorobenzene	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2,4-Trichlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,2-Dichlorobenzene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,3-Dichlorobenzene	37	U	330	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dichlorobenzene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Dioxane	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1,4-Naphthoquinone	72	U	1600	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
1-Naphthylamine	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,3,4,6-Tetrachlorophenol	78	U	1600	78	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4,5-Trichlorophenol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,6-Trichlorophenol	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dichlorophenol	39	U	330	39	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dimethylphenol	56	U	330	56	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,4-Dinitrotoluene	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dichlorophenol	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2,6-Dinitrotoluene	62	U	330	62	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Acetylaminofluorene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chloronaphthalene	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Chlorophenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylnaphthalene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Naphthylamine	61	U	330	61	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitroaniline	120	U	330	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Nitrophenol	140	U	330	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
2-Picoline	45	U	660	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3 & 4 Methylphenol	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dichlorobenzidine	110	U	1600	110	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3,3'-Dimethylbenzidine	150	U	1600	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Methylcholanthrene	70	U	660	70	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
3-Nitroaniline	100	U	330	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4,6-Dinitro-2-methylphenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Aminobiphenyl	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Bromophenyl phenyl ether	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloro-3-methylphenol	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chloroaniline	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Chlorophenyl phenyl ether	43	U	330	43	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroaniline	75	U	1600	75	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitrophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
4-Nitroquinoline-1-oxide	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
5-Nitro-o-toluidine	130	U	660	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
7,12-Dimethylbenz(a)anthracene	69	U	660	69	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acenaphthylene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Acetophenone	34	U	330	34	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
alpha,alpha-Dimethyl phenethylamine	220	U	1600	220	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aniline	60	U	330	60	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Anthracene	49	U	330	49	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Aramite	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]anthracene	59	U	330	59	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[a]pyrene	90	U	330	90	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[b]fluoranthene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[g,h,i]perylene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzo[k]fluoranthene	80	U	330	80	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Benzyl alcohol	52	U	330	52	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
bis(2 chloro-1-methylethyl) ether	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethoxy)methane	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Bis(2-chloroethyl)ether	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	85	U	330	85	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Butyl benzyl phthalate	93	U	330	93	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Carbazole	47	U	330	47	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chlorobenzilate	94	U	330	94	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Chrysene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diallate	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenz(a,h)anthracene	66	U	330	66	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dibenzofuran	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diethylphthalate	82	U	330	82	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethoate	100	U	660	100	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dimethyl phthalate	45	U	330	45	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-butyl phthalate	64	U	330	64	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Di-n-octyl phthalate	130	U	330	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Dinoseb	330	U	660	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Diphenylamine + N-Nitrosodiphenylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Disulfoton	41	U	1600	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Ethyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Famphur	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluoranthene	50	U	330	50	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Fluorene	46	U	330	46	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobenzene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorobutadiene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorocyclopentadiene	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloroethane	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachlorophene	330	U	8300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Hexachloropropene	33	U	3300	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Indeno[1,2,3-cd]pyrene	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isodrin	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isophorone	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Isosafrole	67	U	660	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Kepone	330	U	3300	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
m-Dinitrobenzene	150	U	330	150	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methapyrilene	140	U	1600	140	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl methanesulfonate	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Methyl parathion	120	U	1600	120	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Naphthalene	35	U	330	35	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Nitrobenzene	40	U	330	40	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodiethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodimethylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-butylamine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosodi-n-propylamine	41	U	330	41	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomethylethylamine	72	U	330	72	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosomorpholine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopiperidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
N-Nitrosopyrrolidine	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
o,o',o''-Triethylphosphorothioate	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
O,O-Diethyl O-2-pyrazinyl phosphorothioate	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 160-405450/1-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405450

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Toluidine	51	U	330	51	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Parathion	98	U	1600	98	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Dimethylamino azobenzene	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorobenzene	33	U	330	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloroethane	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachloronitrobenzene	57	U	1600	57	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pentachlorophenol	330	U	1600	330	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenacetin	54	U	660	54	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenanthrene	42	U	330	42	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phenol	38	U	330	38	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Phorate	37	U	1600	37	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
p-Phenylene diamine	67	U	1600	67	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pronamide	53	U	660	53	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyrene	73	U	330	73	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Pyridine	71	U	660	71	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Safrole	33	U	660	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
sym-Trinitrobenzene	130	U	1600	130	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tetraethyl dithiopyrophosphate (sulfotep)	33	U	1600	33	ug/Kg		12/12/18 18:22	12/17/18 13:52	1
Tributyl phosphate	63	U	330	63	ug/Kg		12/12/18 18:22	12/17/18 13:52	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
3-Penten-2-one, 4-methyl-	*331*	*N J*	*ug/Kg*		*4.24*	*141-79-7*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*13400*	*N*	*ug/Kg*		*4.58*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
Unknown	*431*	*N*	*ug/Kg*		*5.13*		*12/12/18 18:22*	*12/17/18 13:52*	*1*
n-Hexadecanoic acid	*440*	*N J*	*ug/Kg*		*10.95*	*57-10-3*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
13-Tertadecen-1-ol acetate	*273*	*N J*	*ug/Kg*		*13.82*	*1000130-79-8*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*70*		*47 - 125*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
2-Fluorophenol (Surr)	*79*		*54 - 102*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Phenol-d5 (Surr)	*74*		*51 - 104*	*12/12/18 18:22*	*12/17/18 13:52*	*1*
Terphenyl-d14 (Surr)	*83*		*59 - 98*	*12/12/18 18:22*	*12/17/18 13:52*	*1*

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	3330	2510		ug/Kg		75	58 - 101
1,2-Dichlorobenzene	3330	2510		ug/Kg		75	57 - 99
1,3-Dichlorobenzene	3330	2410		ug/Kg		72	55 - 98
1,4-Dichlorobenzene	3330	2490		ug/Kg		75	56 - 98
2,4,5-Trichlorophenol	3330	2740		ug/Kg		82	56 - 109
2,4,6-Trichlorophenol	3330	2880		ug/Kg		87	56 - 110

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dichlorophenol	3330	2880		ug/Kg		86	57 - 99
2,4-Dimethylphenol	3330	2760		ug/Kg		83	53 - 97
2,4-Dinitrophenol	3330	2590		ug/Kg		78	10 - 89
2,4-Dinitrotoluene	3330	2900		ug/Kg		87	54 - 105
2,6-Dinitrotoluene	3330	2890		ug/Kg		87	55 - 105
2-Chloronaphthalene	3330	2730		ug/Kg		82	56 - 111
2-Chlorophenol	3330	2780		ug/Kg		83	56 - 99
2-Methylnaphthalene	3330	2730		ug/Kg		82	58 - 98
2-Methylphenol	3330	2710		ug/Kg		81	53 - 97
2-Nitroaniline	3330	2720		ug/Kg		82	55 - 108
2-Nitrophenol	3330	2680		ug/Kg		81	59 - 104
3 & 4 Methylphenol	3330	3100		ug/Kg		93	58 - 108
3,3'-Dichlorobenzidine	3330	2380		ug/Kg		72	42 - 104
3-Nitroaniline	3330	2640		ug/Kg		79	43 - 96
4,6-Dinitro-2-methylphenol	3330	2980		ug/Kg		90	19 - 102
4-Bromophenyl phenyl ether	3330	2900		ug/Kg		87	58 - 109
4-Chloro-3-methylphenol	3330	2810		ug/Kg		84	54 - 98
4-Chloroaniline	3330	2150		ug/Kg		64	41 - 83
4-Chlorophenyl phenyl ether	3330	2730		ug/Kg		82	55 - 105
4-Nitroaniline	3330	2710		ug/Kg		81	49 - 99
4-Nitrophenol	3330	2810		ug/Kg		84	48 - 106
Acenaphthene	3330	2780		ug/Kg		83	55 - 106
Acenaphthylene	3330	2780		ug/Kg		83	56 - 109
Anthracene	3330	2870		ug/Kg		86	56 - 103
Benzo[a]anthracene	3330	2960		ug/Kg		89	56 - 107
Benzo[a]pyrene	3330	2820		ug/Kg		85	57 - 109
Benzo[b]fluoranthene	3330	2790		ug/Kg		84	68 - 109
Benzo[g,h,i]perylene	3330	2640		ug/Kg		79	51 - 126
Benzo[k]fluoranthene	3330	2720		ug/Kg		81	56 - 106
bis(2 chloro-1-methylethyl) ether	3330	2290		ug/Kg		69	49 - 94
Bis(2-chloroethoxy)methane	3330	2520		ug/Kg		76	56 - 99
Bis(2-chloroethyl)ether	3330	2190		ug/Kg		66	53 - 99
Bis(2-ethylhexyl) phthalate	3330	3140		ug/Kg		94	59 - 113
Butyl benzyl phthalate	3330	3070		ug/Kg		92	60 - 112
Carbazole	3330	2990		ug/Kg		90	53 - 98
Chrysene	3330	2930		ug/Kg		88	54 - 107
Dibenz(a,h)anthracene	3330	2910		ug/Kg		87	52 - 126
Dibenzofuran	3330	2740		ug/Kg		82	55 - 103
Diethylphthalate	3330	2910		ug/Kg		87	54 - 101
Di-n-butyl phthalate	3330	3040		ug/Kg		91	57 - 102
Di-n-octyl phthalate	3330	3310		ug/Kg		99	56 - 117
Diphenylamine + N-Nitrosodiphenylamine	3330	3460		ug/Kg		104	63 - 121
Fluoranthene	3330	3010		ug/Kg		90	54 - 100
Fluorene	3330	2870		ug/Kg		86	57 - 106
Hexachlorobenzene	3330	2990		ug/Kg		90	57 - 109
Hexachlorobutadiene	3330	2740		ug/Kg		82	59 - 106
Hexachlorocyclopentadiene	3330	2440		ug/Kg		73	44 - 140

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-405450/2-A
Matrix: Solid
Analysis Batch: 406086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachloroethane	3330	2420		ug/Kg		73	56 - 102
Indeno[1,2,3-cd]pyrene	3330	2940		ug/Kg		88	52 - 132
Isophorone	3330	2260		ug/Kg		68	55 - 96
Naphthalene	3330	2610		ug/Kg		78	57 - 98
Nitrobenzene	3330	2530		ug/Kg		76	58 - 102
N-Nitrosodi-n-propylamine	3330	2530		ug/Kg		76	54 - 98
Pentachlorophenol	3330	2780		ug/Kg		83	35 - 107
Phenanthrene	3330	2900		ug/Kg		87	57 - 103
Phenol	3330	2550		ug/Kg		77	50 - 96
Pyrene	3330	2960		ug/Kg		89	59 - 109

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*47 - 125*
2-Fluorobiphenyl (Surr)	*84*		*59 - 110*
2-Fluorophenol (Surr)	*86*		*54 - 102*
Nitrobenzene-d5 (Surr)	*77*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*91*		*59 - 98*

Lab Sample ID: 160-32192-2 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	33	U	3330	2410		ug/Kg	☼	73	52 - 103
1,2-Dichlorobenzene	35	U	3330	2400		ug/Kg	☼	72	50 - 98
1,3-Dichlorobenzene	37	U	3330	2350		ug/Kg	☼	71	49 - 96
1,4-Dichlorobenzene	37	U	3330	2430		ug/Kg	☼	73	50 - 96
2,4,5-Trichlorophenol	52	U	3330	2650		ug/Kg	☼	80	41 - 116
2,4,6-Trichlorophenol	46	U	3330	2680		ug/Kg	☼	80	40 - 115
2,4-Dichlorophenol	39	U	3330	2710		ug/Kg	☼	82	47 - 104
2,4-Dimethylphenol	55	U	3330	2670		ug/Kg	☼	80	45 - 105
2,4-Dinitrophenol	330	U	3330	2360		ug/Kg	☼	71	10 - 100
2,4-Dinitrotoluene	130	U	3330	2720		ug/Kg	☼	82	42 - 113
2,6-Dinitrotoluene	62	U	3330	2590		ug/Kg	☼	78	46 - 109
2-Chloronaphthalene	37	U	3330	2600		ug/Kg	☼	78	52 - 108
2-Chlorophenol	38	U	3330	2730		ug/Kg	☼	82	48 - 102
2-Methylnaphthalene	40	U	3330	2600		ug/Kg	☼	78	55 - 97
2-Methylphenol	42	U	3330	2730		ug/Kg	☼	82	46 - 98
2-Nitroaniline	120	U	3330	2690		ug/Kg	☼	81	45 - 111
2-Nitrophenol	140	U	3330	2540		ug/Kg	☼	76	38 - 115
3 & 4 Methylphenol	66	U	3330	3120		ug/Kg	☼	94	48 - 111
3,3'-Dichlorobenzidine	110	U	3330	2220		ug/Kg	☼	67	23 - 102
3-Nitroaniline	100	U	3330	2460		ug/Kg	☼	74	32 - 95
4,6-Dinitro-2-methylphenol	330	U	3330	2860		ug/Kg	☼	86	15 - 118
4-Bromophenyl phenyl ether	49	U	3330	2660		ug/Kg	☼	80	53 - 110
4-Chloro-3-methylphenol	42	U	3330	2830		ug/Kg	☼	85	36 - 111
4-Chloroaniline	46	U	3330	2050		ug/Kg	☼	62	32 - 79

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32192-2 MS
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorophenyl phenyl ether	43	U	3330	2660		ug/Kg	☼	80	51 - 103
4-Nitroaniline	74	U	3330	2620		ug/Kg	☼	79	36 - 102
4-Nitrophenol	330	U	3330	2580		ug/Kg	☼	78	40 - 113
Acenaphthene	35	U	3330	2630		ug/Kg	☼	79	53 - 105
Acenaphthylene	46	U	3330	2580		ug/Kg	☼	78	55 - 107
Anthracene	49	U	3330	2720		ug/Kg	☼	82	55 - 103
Benzo[a]anthracene	59	U	3330	2800		ug/Kg	☼	84	48 - 112
Benzo[a]pyrene	89	U	3330	2610		ug/Kg	☼	78	46 - 117
Benzo[b]fluoranthene	33	U	3330	2570		ug/Kg	☼	77	45 - 125
Benzo[g,h,i]perylene	33	U	3330	2480		ug/Kg	☼	74	24 - 134
Benzo[k]fluoranthene	80	U	3330	2540		ug/Kg	☼	76	43 - 114
bis(2 chloro-1-methylethyl) ether	42	U	3330	2360		ug/Kg	☼	71	38 - 98
Bis(2-chloroethoxy)methane	38	U	3330	2430		ug/Kg	☼	73	49 - 100
Bis(2-chloroethyl)ether	33	U	3330	2200		ug/Kg	☼	66	49 - 100
Bis(2-ethylhexyl) phthalate	85	U	3330	3090		ug/Kg	☼	93	50 - 113
Butyl benzyl phthalate	92	U	3330	3000		ug/Kg	☼	90	54 - 112
Carbazole	47	U	3330	2770		ug/Kg	☼	83	47 - 102
Chrysene	45	U	3330	2770		ug/Kg	☼	83	45 - 115
Dibenz(a,h)anthracene	66	U	3330	2770		ug/Kg	☼	83	30 - 134
Dibenzofuran	41	U	3330	2620		ug/Kg	☼	79	50 - 102
Diethylphthalate	82	U	3330	2750		ug/Kg	☼	83	46 - 107
Di-n-butyl phthalate	64	U	3330	2910		ug/Kg	☼	87	49 - 107
Di-n-octyl phthalate	130	U	3330	3260		ug/Kg	☼	98	35 - 125
Diphenylamine + N-Nitrosodiphenylamine	33	U	3330	3240		ug/Kg	☼	97	33 - 140
Fluoranthene	50	U	3330	2800		ug/Kg	☼	84	45 - 109
Fluorene	46	U	3330	2730		ug/Kg	☼	82	45 - 109
Hexachlorobenzene	42	U	3330	2750		ug/Kg	☼	83	48 - 113
Hexachlorobutadiene	40	U	3330	2600		ug/Kg	☼	78	48 - 109
Hexachlorocyclopentadiene	330	U	3330	2360		ug/Kg	☼	71	21 - 144
Hexachloroethane	35	U	3330	2230		ug/Kg	☼	67	44 - 102
Indeno[1,2,3-cd]pyrene	63	U	3330	2780		ug/Kg	☼	84	30 - 136
Isophorone	37	U	3330	2230		ug/Kg	☼	67	48 - 100
Naphthalene	35	U	3330	2540		ug/Kg	☼	76	54 - 98
Nitrobenzene	40	U	3330	2460		ug/Kg	☼	74	51 - 106
N-Nitrosodi-n-propylamine	40	U	3330	2510		ug/Kg	☼	75	47 - 104
Pentachlorophenol	330	U	3330	2490		ug/Kg	☼	75	23 - 116
Phenanthrene	42	U	3330	2730		ug/Kg	☼	82	53 - 106
Phenol	38	U	3330	2520		ug/Kg	☼	76	41 - 100
Pyrene	73	U	3330	2820		ug/Kg	☼	85	39 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*78*		*47 - 125*
2-Fluorobiphenyl (Surr)	*81*		*59 - 110*
2-Fluorophenol (Surr)	*83*		*54 - 102*
Nitrobenzene-d5 (Surr)	*74*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*87*		*59 - 98*

Lab Sample ID: 160-32192-2 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	33	U	3310	2460		ug/Kg	☼	74	52 - 103	2	30
1,2-Dichlorobenzene	35	U	3310	2440		ug/Kg	☼	74	50 - 98	2	30
1,3-Dichlorobenzene	37	U	3310	2330		ug/Kg	☼	70	49 - 96	1	30
1,4-Dichlorobenzene	37	U	3310	2460		ug/Kg	☼	74	50 - 96	1	30
2,4,5-Trichlorophenol	52	U	3310	2680		ug/Kg	☼	81	41 - 116	1	30
2,4,6-Trichlorophenol	46	U	3310	2730		ug/Kg	☼	82	40 - 115	2	30
2,4-Dichlorophenol	39	U	3310	2960		ug/Kg	☼	90	47 - 104	9	30
2,4-Dimethylphenol	55	U	3310	2800		ug/Kg	☼	85	45 - 105	5	30
2,4-Dinitrophenol	330	U	3310	2440		ug/Kg	☼	74	10 - 100	3	30
2,4-Dinitrotoluene	130	U	3310	2780		ug/Kg	☼	84	42 - 113	2	30
2,6-Dinitrotoluene	62	U	3310	2780		ug/Kg	☼	84	46 - 109	7	30
2-Chloronaphthalene	37	U	3310	2700		ug/Kg	☼	82	52 - 108	4	30
2-Chlorophenol	38	U	3310	2730		ug/Kg	☼	83	48 - 102	0	30
2-Methylnaphthalene	40	U	3310	2730		ug/Kg	☼	83	55 - 97	5	30
2-Methylphenol	42	U	3310	2710		ug/Kg	☼	82	46 - 98	1	30
2-Nitroaniline	120	U	3310	2530		ug/Kg	☼	76	45 - 111	6	30
2-Nitrophenol	140	U	3310	2690		ug/Kg	☼	81	38 - 115	6	30
3 & 4 Methylphenol	66	U	3310	3130		ug/Kg	☼	95	48 - 111	0	30
3,3'-Dichlorobenzidine	110	U	3310	2190		ug/Kg	☼	66	23 - 102	1	30
3-Nitroaniline	100	U	3310	2380		ug/Kg	☼	72	32 - 95	3	30
4,6-Dinitro-2-methylphenol	330	U	3310	2980		ug/Kg	☼	90	15 - 118	4	30
4-Bromophenyl phenyl ether	49	U	3310	2860		ug/Kg	☼	87	53 - 110	7	30
4-Chloro-3-methylphenol	42	U	3310	2830		ug/Kg	☼	86	36 - 111	0	30
4-Chloroaniline	46	U	3310	2160		ug/Kg	☼	65	32 - 79	5	30
4-Chlorophenyl phenyl ether	43	U	3310	2680		ug/Kg	☼	81	51 - 103	1	30
4-Nitroaniline	74	U	3310	2710		ug/Kg	☼	82	36 - 102	3	30
4-Nitrophenol	330	U	3310	2660		ug/Kg	☼	80	40 - 113	3	30
Acenaphthene	35	U	3310	2700		ug/Kg	☼	82	53 - 105	3	30
Acenaphthylene	46	U	3310	2710		ug/Kg	☼	82	55 - 107	5	30
Anthracene	49	U	3310	2800		ug/Kg	☼	85	55 - 103	3	30
Benzo[a]anthracene	59	U	3310	2820		ug/Kg	☼	85	48 - 112	1	30
Benzo[a]pyrene	89	U	3310	2720		ug/Kg	☼	82	46 - 117	4	30
Benzo[b]fluoranthene	33	U	3310	2720		ug/Kg	☼	82	45 - 125	6	30
Benzo[g,h,i]perylene	33	U	3310	2660		ug/Kg	☼	80	24 - 134	7	30
Benzo[k]fluoranthene	80	U	3310	2730		ug/Kg	☼	82	43 - 114	7	30
bis(2 chloro-1-methylethyl) ether	42	U	3310	2300		ug/Kg	☼	70	38 - 98	3	30
Bis(2-chloroethoxy)methane	38	U	3310	2500		ug/Kg	☼	76	49 - 100	3	30
Bis(2-chloroethyl)ether	33	U	3310	2140		ug/Kg	☼	65	49 - 100	3	30
Bis(2-ethylhexyl) phthalate	85	U	3310	3050		ug/Kg	☼	92	50 - 113	1	30
Butyl benzyl phthalate	92	U	3310	2950		ug/Kg	☼	89	54 - 112	2	30
Carbazole	47	U	3310	2910		ug/Kg	☼	88	47 - 102	5	30
Chrysene	45	U	3310	2860		ug/Kg	☼	87	45 - 115	3	30
Dibenz(a,h)anthracene	66	U	3310	2900		ug/Kg	☼	88	30 - 134	5	30
Dibenzofuran	41	U	3310	2700		ug/Kg	☼	82	50 - 102	3	30
Diethylphthalate	82	U	3310	2840		ug/Kg	☼	86	46 - 107	3	30
Di-n-butyl phthalate	64	U	3310	3040		ug/Kg	☼	92	49 - 107	5	30
Di-n-octyl phthalate	130	U	3310	3200		ug/Kg	☼	97	35 - 125	2	30
Diphenylamine + N-Nitrosodiphenylamine	33	U	3310	3400		ug/Kg	☼	103	33 - 140	5	30
Fluoranthene	50	U	3310	3000		ug/Kg	☼	91	45 - 109	7	30

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32192-2 MSD — **Client Sample ID: B3MMR4**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406086 — **Prep Batch: 405450**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	46	U	3310	2810		ug/Kg	☼	85	45 - 109	3	30
Hexachlorobenzene	42	U	3310	2900		ug/Kg	☼	88	48 - 113	5	30
Hexachlorobutadiene	40	U	3310	2640		ug/Kg	☼	80	48 - 109	1	30
Hexachlorocyclopentadiene	330	U	3310	2310		ug/Kg	☼	70	21 - 144	2	30
Hexachloroethane	35	U	3310	2350		ug/Kg	☼	71	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	63	U	3310	2920		ug/Kg	☼	88	30 - 136	5	30
Isophorone	37	U	3310	2270		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	35	U	3310	2620		ug/Kg	☼	79	54 - 98	3	30
Nitrobenzene	40	U	3310	2560		ug/Kg	☼	77	51 - 106	4	30
N-Nitrosodi-n-propylamine	40	U	3310	2600		ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol	330	U	3310	2740		ug/Kg	☼	83	23 - 116	10	30
Phenanthrene	42	U	3310	2840		ug/Kg	☼	86	53 - 106	4	30
Phenol	38	U	3310	2550		ug/Kg	☼	77	41 - 100	1	30
Pyrene	73	U	3310	2880		ug/Kg	☼	87	39 - 130	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*83*		*59 - 110*
2-Fluorophenol (Surr)	*87*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
160-32192-2	B3MMR4	97	99	105	104
160-32192-2 MS	B3MMR4	94	101	100	104
160-32192-2 MSD	B3MMR4	91	103	101	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(67-132)	(59-150)	(53-143)	(74-135)
LCS 160-406531/5	Lab Control Sample	98	101	102	106
LCSD 160-406531/6	Lab Control Sample Dup	93	102	101	106
MB 160-406531/8	Method Blank	95	103	103	105

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32192-2	B3MMR4	77	76	76	62	73	80
160-32192-2 MS	B3MMR4	78	81	83	74	76	87
160-32192-2 MSD	B3MMR4	82	83	87	75	78	89

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32192-1	B3MMR3	75	64 X
160-32192-1 MS	B3MMR3	81	63 X
160-32192-1 MSD	B3MMR3	92	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32192-1	B3MMR3	84
160-32192-1 MS	B3MMR3	81
160-32192-1 MSD	B3MMR3	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Pesticides - Sample Data Groups (SDGs) SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31919-1. SL32018-1, SL32078-1, SL32124-1 and SL32192-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3MMP5	11/15/18	Soil	C	8081A
B3MMP9	11/26/18	Soil	C	8081A
B3M454	11/29/18	Soil	C	8081A
B3M470	11/29/18	Soil	C	8081A
B3M450	11/29/18	Soil	C	8081A
B3M462	11/29/18	Soil	C	8081A
B3M458	11/29/18	Soil	C	8081A
B3M466	11/29/18	Soil	C	8081A
B3M438	11/29/18	Soil	C	8081A
B3M434	11/29/18	Soil	C	8081A
B3M418	11/29/18	Soil	C	8081A
B3M442	12/03/18	Soil	C	8081A
B3M430	12/03/18	Soil	C	8081A
B3M446	12/03/18	Soil	C	8081A
B3M414	12/03/18	Soil	C	8081A
B3M422	12/03/18	Soil	C	8081A
B3M426	12/03/18	Soil	C	8081A
B3MMR3	12/06/18	Soil	C	8081A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0. Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for pesticides are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike accuracy limits for pesticides are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG SL32192-1, the tetrachloro-m-xylene surrogate recovery for samples B3MMR3 and B3MMR3MS were below the lower acceptance limit but ≥10%. All associated sample results were non-detects and based on professional judgment data should not be qualified as a result. Since sample B3MMR3MS was a QC sample, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the MS and/or MSD recoveries for endosulfan I and endosulfan II were below the lower acceptance limit but ≥20%. All results for sample B3MMP5 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32018-1, the MS and/or MSD recoveries for endosulfan I, endosulfan II, endosulfan sulfate, endrin aldehyde, beta-BHC and heptachlor were below the lower acceptance limit but ≥20%. All results for sample B3MMP9 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG SL32078-1, the MSD recovery for beta-BHC was above the upper acceptance limit. All associated sample results were non-detects and should not be qualified as a result.

For SDG SL32124-1, the MS and/or MSD recoveries for endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, heptachlor, methoxychlor, trans-chlordane and 4,4'-DDD were below the lower acceptance limit but ≥20%. All associated trans-chlordane sample results were detects and should be qualified as estimates and flagged "J." All other sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the MS recoveries for endosulfan I and heptachlor were below the lower acceptance limit but ≥20%. All results for sample B3MMR3 were non-detects and should be qualified as estimates and flagged "UJ."

It should be mentioned that MS/MSD analyses were not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG SL31919-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. The endosulfan I and endosulfan II results for sample B3MMP5 were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ."

For SDG SL32018-1, the LCS recoveries for endosulfan I and endosulfan II were below the lower acceptance limit. The endosulfan I and endosulfan II results for sample B3MMP9 were non-detects and based on professional judgment; data should be qualified as estimates and flagged "UJ."

For SDG SL32124-1, the LCS recoveries for endosulfan sulfate and endrin aldehyde were below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG SL32192-1, the LCS recovery for endosulfan I was below the lower acceptance limit. The endosulfan I result for associated sample B3MMR3 was a non-detect and based on professional judgment should be qualified as an estimate and flagged "UJ."

It should be mentioned that LCS analysis was not performed for multi-component analyte toxaphene. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were met. CRDL for other pesticides were not provided.

- **Completeness**

SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to matrix spike and LCS infractions. See the table in Appendix 2 for a listing of affected samples.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticides Data Qualification Summary			
SDGs: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
endosulfan I, endosulfan II	UJ	B3MMP5, B3MM9	Low matrix spike recoveries and low LCS recoveries
endosulfan sulfate, endrin aldehyde, beta-BHC, heptachlor	UJ	B3MMP9	Low matrix spike recoveries
trans-chlordane	J	B3M442, B3M430, B3M446, B3M414, B3M422, B3M426	Low matrix spike recovery
endosulfan I, endosulfan II, endrin, endrin ketone, heptachlor, methoxychlor, 4,4'-DDD	UJ	B3M442, B3M430, B3M446, B3M414, B3M422, B3M426	Low matrix spike recoveries
endosulfan sulfate, endrin aldehyde	UJ	B3M442, B3M430, B3M446, B3M414, B3M422, B3M426	Low matrix spike recoveries and low LCS recoveries
heptachlor	UJ	B3MMR3	Low matrix spike recoveries
endosulfan I	UJ	B3MMR3	Low matrix spike recoveries and low LCS recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-016		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1		
ANALYSES PERFORMED					
SW-846 8081 X	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31919-1: B3MMP5					
SDG SL32018-1: B3MMP9					
SDG SL32078-1: B3M454, B3M470, B3M450, B3M462, B3M458, B3M466, B3M438, B3M434, B3M418					
SDG SL32124-1: B3M442, B3M430, B3M446, B3M414, B3M422, B3M426,					

SDG SL32192-1: B3MMR3

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)
DDT and endrin breakdowns acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	(Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SDG SL32192-1: B3MMR3 TCX2 64%; B3MMR3MS TCX2 63%

MS/MSD

SDG SL31919-1: endosulfan I 51%/46%; endosulfan II 54%/49%

SDG SL32018-1: endosulfan I 40%/41%; endosulfan II 46%/45; endosulfan sulfate 69%/69%; endrin aldehyde 67%/67%; beta-BHC 69% (MSD), heptachlor 69%

SDG SL32078-1: beta-BHC 132% (MSD)

SDG SL32124-1: endosulfan I 66%/69%; endosulfan II 69% (MS); endosulfan sulfate 58%/62%; endrin 69% (MS); endrin aldehyde 61%/64%; endrin ketone 66%/68%; heptachlor 69% (MS); methoxychlor 67%/68%; trans-chlordane 69% (MS); 4,4'-DDD 69% (MSD)

SDG SL32192-1: endosulfan I 65% (MS); heptachlor 69% (MS)

SEE LAST PAGE FOR LCS INFORMATION

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes) No N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No (N/A)
Positive results resolved acceptably?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin were provided. No other CRDLs were provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

LCS

SDG SL31919-1: endosulfan I 56%; endosulfan II 59%

SDG SL32018-1: endosulfan I 47%; endosulfan II 52%

SDG SL32124-1: endosulfan sulfate 68%; endrin aldehyde 68%

SDG SL32192-1: endosulfan I 69%

Appendix 4

Additional Documentation Requested By Client

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - DL (Continued)

Lab Sample ID: 160-31915-A-1-C MSD
Matrix: Solid
Analysis Batch: 403968

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbazole - DL	240	U D	3420	2960	D	ug/Kg	☼	87	47 - 102	6	30
Chrysene - DL	230	U D	3420	2820	D	ug/Kg	☼	83	45 - 115	3	30
Dibenz(a,h)anthracene - DL	340	U D	3420	3320	D	ug/Kg	☼	97	30 - 134	3	30
Dibenzofuran - DL	210	U D	3420	2820	D	ug/Kg	☼	83	50 - 102	4	30
Diethylphthalate - DL	420	U D	3420	2900	D	ug/Kg	☼	85	46 - 107	2	30
Di-n-butyl phthalate - DL	330	U D	3420	3080	D	ug/Kg	☼	90	49 - 107	7	30
Di-n-octyl phthalate - DL	680	U D	3420	3170	D	ug/Kg	☼	93	35 - 125	1	30
Diphenylamine + N-Nitrosodiphenylamine - DL	170	U D	3420	3400	D	ug/Kg	☼	100	33 - 140	5	30
Fluoranthene - DL	260	U D	3420	3070	D	ug/Kg	☼	90	45 - 109	6	30
Fluorene - DL	230	U D	3420	3060	D	ug/Kg	☼	90	45 - 109	11	30
Hexachlorobenzene - DL	220	U D	3420	2890	D	ug/Kg	☼	85	48 - 113	9	30
Hexachlorobutadiene - DL	200	U D	3420	2540	D	ug/Kg	☼	74	48 - 109	3	30
Hexachlorocyclopentadiene - DL	1700	U D	3420	2080	J D	ug/Kg	☼	61	21 - 144	5	30
Hexachloroethane - DL	180	U D	3420	2330	D	ug/Kg	☼	68	44 - 102	1	30
Indeno[1,2,3-cd]pyrene - DL	320	U D	3420	3580	D	ug/Kg	☼	105	30 - 136	6	30
Isophorone - DL	190	U D	3420	2450	D	ug/Kg	☼	72	48 - 100	1	30
Naphthalene - DL	180	U D	3420	2570	D	ug/Kg	☼	75	54 - 98	0	30
Nitrobenzene - DL	210	U D	3420	2570	D	ug/Kg	☼	75	51 - 106	4	30
N-Nitrosodi-n-propylamine - DL	210	U D	3420	2700	D	ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol - DL	1700	U D	3420	2320	J D	ug/Kg	☼	68	23 - 116	8	30
Phenanthrene - DL	220	U D	3420	2950	D	ug/Kg	☼	86	53 - 106	6	30
Phenol - DL	190	U D	3420	2720	D	ug/Kg	☼	80	41 - 100	1	30
Pyrene - DL	370	U D	3420	2930	D	ug/Kg	☼	86	39 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr) - DL	*82*		*47 - 125*
2-Fluorobiphenyl (Surr) - DL	*83*		*59 - 110*
2-Fluorophenol (Surr) - DL	*73*		*54 - 102*
Nitrobenzene-d5 (Surr) - DL	*73*		*44 - 120*
Phenol-d5 (Surr) - DL	*78*		*51 - 104*
Terphenyl-d14 (Surr) - DL	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-402188/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402188

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
Toxaphene	23	U	67	23	ug/Kg		11/21/18 13:23	12/09/18 13:29	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/21/18 13:23	12/09/18 13:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*105*		*72 - 115*	*11/21/18 13:23*	*12/09/18 13:29*	*1*
Tetrachloro-m-xylene	*95*		*71 - 111*	*11/21/18 13:23*	*12/09/18 13:29*	*1*

Lab Sample ID: LCS 160-402188/2-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	17.6		ug/Kg		106	72 - 117
4,4'-DDE	16.7	17.6	o	ug/Kg		105	75 - 104
4,4'-DDT	16.7	18.1		ug/Kg		109	72 - 119
Aldrin	16.7	16.2		ug/Kg		97	70 - 102
alpha-BHC	16.7	16.1		ug/Kg		97	72 - 111
alpha-Chlordane	16.7	16.5		ug/Kg		99	72 - 105
beta-BHC	16.7	20.6	o	ug/Kg		123	68 - 102
delta-BHC	16.7	16.3		ug/Kg		98	72 - 117
Dieldrin	16.7	17.1		ug/Kg		103	72 - 108
Endosulfan I	16.7	9.27		ug/Kg		56	34 - 96
Endosulfan II	16.7	9.84		ug/Kg		59	46 - 96
Endosulfan sulfate	16.7	17.0		ug/Kg		102	68 - 108
Endrin	16.7	16.8		ug/Kg		101	76 - 116
Endrin aldehyde	16.7	16.1		ug/Kg		96	54 - 97
Endrin ketone	16.7	17.2		ug/Kg		103	71 - 113
gamma-BHC (Lindane)	16.7	16.1		ug/Kg		96	71 - 107
Heptachlor	16.7	15.2		ug/Kg		91	55 - 128
Heptachlor epoxide	16.7	16.5		ug/Kg		99	72 - 107
Methoxychlor	16.7	18.0		ug/Kg		108	71 - 124
trans-Chlordane	16.7	16.8		ug/Kg		101	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*104*		*72 - 115*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 160-402188/2-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402188

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*71 - 111*

Lab Sample ID: 160-31887-C-5-B MS
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.36	U	17.6	15.9		ug/Kg	☼	90	60 - 121
4,4'-DDE	2.3	o	17.6	19.6		ug/Kg	☼	98	63 - 111
4,4'-DDT	1.2	J	17.6	18.0		ug/Kg	☼	96	59 - 122
Aldrin	0.60	U	17.6	16.6		ug/Kg	☼	94	57 - 110
alpha-BHC	0.41	U	17.6	16.6		ug/Kg	☼	94	62 - 117
alpha-Chlordane	0.98	U	17.6	17.2		ug/Kg	☼	98	58 - 114
beta-BHC	0.48	U o N	17.6	20.9	N	ug/Kg	☼	119	61 - 108
delta-BHC	0.36	U	17.6	16.1		ug/Kg	☼	92	64 - 121
Dieldrin	0.22	U	17.6	17.0		ug/Kg	☼	97	57 - 114
Endosulfan I	0.60	U	17.6	9.01		ug/Kg	☼	51	31 - 89
Endosulfan II	0.30	U	17.6	9.44		ug/Kg	☼	54	40 - 93
Endosulfan sulfate	0.35	U	17.6	15.6		ug/Kg	☼	89	56 - 112
Endrin	0.35	U	17.6	16.5		ug/Kg	☼	94	64 - 125
Endrin aldehyde	0.41	U	17.6	15.0		ug/Kg	☼	85	45 - 101
Endrin ketone	0.44	U	17.6	16.1		ug/Kg	☼	92	59 - 115
gamma-BHC (Lindane)	0.50	U	17.6	16.4		ug/Kg	☼	93	61 - 113
Heptachlor	0.30	U	17.6	15.8		ug/Kg	☼	90	33 - 150
Heptachlor epoxide	0.50	U	17.6	16.7		ug/Kg	☼	95	60 - 114
Methoxychlor	0.86	U	17.6	16.9		ug/Kg	☼	96	58 - 130
trans-Chlordane	0.90	J	17.6	17.4		ug/Kg	☼	94	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*97*		*72 - 115*
Tetrachloro-m-xylene	*95*		*71 - 111*

Lab Sample ID: 160-31887-C-5-C MSD
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.36	U	17.4	14.3		ug/Kg	☼	82	60 - 121	10	30
4,4'-DDE	2.3	o	17.4	17.3		ug/Kg	☼	86	63 - 111	12	30
4,4'-DDT	1.2	J	17.4	17.0		ug/Kg	☼	91	59 - 122	6	30
Aldrin	0.60	U	17.4	14.8		ug/Kg	☼	85	57 - 110	11	30
alpha-BHC	0.41	U	17.4	15.2		ug/Kg	☼	88	62 - 117	9	30
alpha-Chlordane	0.98	U	17.4	15.6		ug/Kg	☼	90	58 - 114	10	30
beta-BHC	0.48	U o N	17.4	19.1	N	ug/Kg	☼	110	61 - 108	9	30
delta-BHC	0.36	U	17.4	14.9		ug/Kg	☼	86	64 - 121	8	30
Dieldrin	0.22	U	17.4	15.0		ug/Kg	☼	86	57 - 114	12	30
Endosulfan I	0.60	U	17.4	8.05		ug/Kg	☼	46	31 - 89	11	30
Endosulfan II	0.30	U	17.4	8.52		ug/Kg	☼	49	40 - 93	10	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-C-5-C MSD
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endosulfan sulfate	0.35	U	17.4	13.9		ug/Kg	☼	80	56 - 112	11	30
Endrin	0.35	U	17.4	14.5		ug/Kg	☼	84	64 - 125	12	30
Endrin aldehyde	0.41	U	17.4	13.5		ug/Kg	☼	78	45 - 101	11	30
Endrin ketone	0.44	U	17.4	14.2		ug/Kg	☼	82	59 - 115	13	30
gamma-BHC (Lindane)	0.50	U	17.4	15.0		ug/Kg	☼	86	61 - 113	9	30
Heptachlor	0.30	U	17.4	14.1		ug/Kg	☼	81	33 - 150	12	30
Heptachlor epoxide	0.50	U	17.4	15.0		ug/Kg	☼	86	60 - 114	11	30
Methoxychlor	0.86	U	17.4	14.9		ug/Kg	☼	86	58 - 130	13	30
trans-Chlordane	0.90	J	17.4	15.6		ug/Kg	☼	85	62 - 114	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*94*		*23 - 146*	*11/21/18 16:13*	*12/03/18 18:08*	*1*

Lab Sample ID: LCS 160-402292/2-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402292

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	TBP (47-125)	FBP (59-110)	2FP (54-102)	NBZ (44-120)	PHL (51-104)	TPHL (59-98)
LCS 160-402691/2-A	Lab Control Sample	82	84	82	79	82	80
MB 160-402691/1-A	Method Blank	69	79	79	69	78	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31919-1	B3MMP5	92	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB2 (72-115)	TCX2 (71-111)
160-31887-C-5-B MS	Matrix Spike	97	95
160-31887-C-5-C MSD	Matrix Spike Duplicate	92	89
LCS 160-402188/2-A	Lab Control Sample	104	99
MB 160-402188/1-A	Method Blank	105	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	DCB2 (23-146)
160-31919-1	B3MMP5	74

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32018-1 MSD
Matrix: Soil
Analysis Batch: 404143

Client Sample ID: B3MMR0
Prep Type: Total/NA
Prep Batch: 403615

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	33	U	3330	3280		ug/Kg	☼	99	33 - 140	3	30
Fluoranthene	50	U	3330	2780		ug/Kg	☼	84	45 - 109	3	30
Fluorene	45	U	3330	2750		ug/Kg	☼	83	45 - 109	5	30
Hexachlorobenzene	42	U	3330	2770		ug/Kg	☼	83	48 - 113	2	30
Hexachlorobutadiene	40	U	3330	2620		ug/Kg	☼	79	48 - 109	2	30
Hexachlorocyclopentadiene	330	U	3330	2420		ug/Kg	☼	73	21 - 144	3	30
Hexachloroethane	34	U	3330	2340		ug/Kg	☼	70	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	63	U	3330	2540		ug/Kg	☼	76	30 - 136	2	30
Isophorone	37	U	3330	2440		ug/Kg	☼	73	48 - 100	5	30
Naphthalene	35	U	3330	2570		ug/Kg	☼	77	54 - 98	2	30
Nitrobenzene	40	U	3330	2650		ug/Kg	☼	80	51 - 106	5	30
N-Nitrosodi-n-propylamine	40	U	3330	2630		ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol	330	U	3330	2570		ug/Kg	☼	77	23 - 116	1	30
Phenanthrene	42	U	3330	2800		ug/Kg	☼	84	53 - 106	1	30
Phenol	38	U	3330	2650		ug/Kg	☼	80	41 - 100	1	30
Pyrene	73	U	3330	2830		ug/Kg	☼	85	39 - 130	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*47 - 125*
2-Fluorobiphenyl (Surr)	*82*		*59 - 110*
2-Fluorophenol (Surr)	*80*		*54 - 102*
Nitrobenzene-d5 (Surr)	*79*		*44 - 120*
Phenol-d5 (Surr)	*81*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-403441/1-A
Matrix: Solid
Analysis Batch: 406890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin	0.33	U	1.7	0.33	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-403441/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
Toxaphene	23	U	67	23	ug/Kg		11/29/18 14:41	12/20/18 15:59	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		11/29/18 14:41	12/20/18 15:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*	*11/29/18 14:41*	*12/20/18 15:59*	*1*
Tetrachloro-m-xylene	*87*		*71 - 111*	*11/29/18 14:41*	*12/20/18 15:59*	*1*

Lab Sample ID: LCS 160-403441/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	14.3		ug/Kg		86	72 - 117
4,4'-DDE	16.7	14.8		ug/Kg		89	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	13.8		ug/Kg		83	70 - 102
alpha-BHC	16.7	14.2		ug/Kg		85	72 - 111
alpha-Chlordane	16.7	14.4		ug/Kg		86	72 - 105
beta-BHC	16.7	13.4		ug/Kg		80	68 - 102
delta-BHC	16.7	13.8		ug/Kg		83	72 - 117
Dieldrin	16.7	14.6		ug/Kg		88	72 - 108
Endosulfan I	16.7	7.82		ug/Kg		47	34 - 96
Endosulfan II	16.7	8.73		ug/Kg		52	46 - 96
Endosulfan sulfate	16.7	13.3		ug/Kg		80	68 - 108
Endrin	16.7	13.8		ug/Kg		83	76 - 116
Endrin aldehyde	16.7	12.7		ug/Kg		76	54 - 97
Endrin ketone	16.7	14.1		ug/Kg		85	71 - 113
gamma-BHC (Lindane)	16.7	13.8		ug/Kg		83	71 - 107
Heptachlor	16.7	13.9		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.2		ug/Kg		85	72 - 107
Methoxychlor	16.7	14.3		ug/Kg		86	71 - 124
trans-Chlordane	16.7	14.4		ug/Kg		87	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.34	U	16.5	12.2		ug/Kg	☼	74	60 - 121
4,4'-DDE	0.83	U	16.5	12.6		ug/Kg	☼	76	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.62	U	16.5	13.3		ug/Kg	☼	81	59 - 122
Aldrin	0.57	U	16.5	11.7		ug/Kg	☼	71	57 - 110
alpha-BHC	0.38	U	16.5	12.2		ug/Kg	☼	74	62 - 117
alpha-Chlordane	0.93	U	16.5	12.4		ug/Kg	☼	75	58 - 114
beta-BHC	0.46	U	16.5	11.7		ug/Kg	☼	71	61 - 108
delta-BHC	0.34	U	16.5	12.1		ug/Kg	☼	74	64 - 121
Dieldrin	0.21	U	16.5	12.5		ug/Kg	☼	76	57 - 114
Endosulfan I	0.57	U	16.5	6.62		ug/Kg	☼	40	31 - 89
Endosulfan II	0.29	U	16.5	7.53		ug/Kg	☼	46	40 - 93
Endosulfan sulfate	0.34	U	16.5	11.4		ug/Kg	☼	69	56 - 112
Endrin	0.33	U	16.5	11.8		ug/Kg	☼	71	64 - 125
Endrin aldehyde	0.39	U	16.5	11.0		ug/Kg	☼	67	45 - 101
Endrin ketone	0.41	U	16.5	12.4		ug/Kg	☼	75	59 - 115
gamma-BHC (Lindane)	0.47	U	16.5	11.8		ug/Kg	☼	72	61 - 113
Heptachlor	0.28	U	16.5	11.7		ug/Kg	☼	71	33 - 150
Heptachlor epoxide	0.47	U	16.5	12.2		ug/Kg	☼	74	60 - 114
Methoxychlor	0.82	U	16.5	12.4		ug/Kg	☼	75	58 - 130
trans-Chlordane	0.38	U	16.5	12.3		ug/Kg	☼	74	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*85*		*72 - 115*
Tetrachloro-m-xylene	*72*		*71 - 111*

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406890 — **Prep Batch: 403441**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.34	U	16.5	11.9		ug/Kg	☼	72	60 - 121	2	30
4,4'-DDE	0.83	U	16.5	12.5		ug/Kg	☼	76	63 - 111	1	30
4,4'-DDT	0.62	U	16.5	13.4		ug/Kg	☼	81	59 - 122	1	30
Aldrin	0.57	U	16.5	11.6		ug/Kg	☼	70	57 - 110	1	30
alpha-BHC	0.38	U	16.5	12.1		ug/Kg	☼	73	62 - 117	1	30
alpha-Chlordane	0.93	U	16.5	12.5		ug/Kg	☼	76	58 - 114	1	30
beta-BHC	0.46	U	16.5	11.3		ug/Kg	☼	69	61 - 108	3	30
delta-BHC	0.34	U	16.5	12.3		ug/Kg	☼	75	64 - 121	1	30
Dieldrin	0.21	U	16.5	12.7		ug/Kg	☼	77	57 - 114	2	30
Endosulfan I	0.57	U	16.5	6.72		ug/Kg	☼	41	31 - 89	1	30
Endosulfan II	0.29	U	16.5	7.46		ug/Kg	☼	45	40 - 93	1	30
Endosulfan sulfate	0.34	U	16.5	11.4		ug/Kg	☼	69	56 - 112	0	30
Endrin	0.33	U	16.5	12.0		ug/Kg	☼	73	64 - 125	2	30
Endrin aldehyde	0.39	U	16.5	11.0		ug/Kg	☼	67	45 - 101	0	30
Endrin ketone	0.41	U	16.5	12.4		ug/Kg	☼	75	59 - 115	0	30
gamma-BHC (Lindane)	0.47	U	16.5	11.7		ug/Kg	☼	71	61 - 113	1	30
Heptachlor	0.28	U	16.5	11.4		ug/Kg	☼	69	33 - 150	3	30
Heptachlor epoxide	0.47	U	16.5	12.3		ug/Kg	☼	74	60 - 114	0	30
Methoxychlor	0.82	U	16.5	12.3		ug/Kg	☼	75	58 - 130	1	30
trans-Chlordane	0.38	U	16.5	12.3		ug/Kg	☼	75	62 - 114	0	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		72 - 115
Tetrachloro-m-xylene	77		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403415/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1248	11	U	33	11	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1254	13	U	33	13	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1260	10	U	33	10	ug/Kg		11/29/18 12:02	12/13/18 17:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	83		23 - 146	11/29/18 12:02	12/13/18 17:12	1

Lab Sample ID: LCS 160-403415/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	154		ug/Kg		93	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.6	U	166	149		ug/Kg	☼	90	23 - 140
Aroclor 1260	9.9	U	166	147		ug/Kg	☼	88	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.6	U	166	147		ug/Kg	☼	88	23 - 140	2	30
Aroclor 1260	9.9	U	166	146		ug/Kg	☼	88	20 - 131	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32018-2	B3MMP9	79	75
160-32018-2 MS	B3MMP9	85	72
160-32018-2 MSD	B3MMP9	81	77

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-32018-2	B3MMP9	94
160-32018-2 MS	B3MMP9	86
160-32018-2 MSD	B3MMP9	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32078-10 MSD
Matrix: Soil
Analysis Batch: 404808

Client Sample ID: B3M451
Prep Type: Total/NA
Prep Batch: 404121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chrysene	50	U	3650	3030		ug/Kg	☼	83	45 - 115	2	30
Dibenz(a,h)anthracene	72	U	3650	2350		ug/Kg	☼	64	30 - 134	10	30
Dibenzofuran	44	U	3650	2820		ug/Kg	☼	77	50 - 102	3	30
Diethylphthalate	89	U	3650	3000		ug/Kg	☼	82	46 - 107	5	30
Di-n-butyl phthalate	70	U	3650	3090		ug/Kg	☼	85	49 - 107	1	30
Di-n-octyl phthalate	140	U	3650	3370		ug/Kg	☼	92	35 - 125	1	30
Diphenylamine + N-Nitrosodiphenylamine	36	U	3650	3430		ug/Kg	☼	94	33 - 140	3	30
Fluoranthene	55	U	3650	3040		ug/Kg	☼	83	45 - 109	0	30
Fluorene	50	U	3650	2890		ug/Kg	☼	79	45 - 109	4	30
Hexachlorobenzene	46	U	3650	2940		ug/Kg	☼	81	48 - 113	1	30
Hexachlorobutadiene	44	U	3650	2690		ug/Kg	☼	74	48 - 109	2	30
Hexachlorocyclopentadiene	360	U	3650	2340		ug/Kg	☼	64	21 - 144	0	30
Hexachloroethane	38	U	3650	2300		ug/Kg	☼	63	44 - 102	11	30
Indeno[1,2,3-cd]pyrene	69	U	3650	2330		ug/Kg	☼	64	30 - 136	8	30
Isophorone	41	U	3650	2340		ug/Kg	☼	64	48 - 100	4	30
Naphthalene	39	U	3650	2630		ug/Kg	☼	72	54 - 98	6	30
Nitrobenzene	44	U	3650	2470		ug/Kg	☼	68	51 - 106	9	30
N-Nitrosodi-n-propylamine	44	U	3650	2590		ug/Kg	☼	71	47 - 104	7	30
Pentachlorophenol	360	U	3650	2650		ug/Kg	☼	73	23 - 116	1	30
Phenanthrene	46	U	3650	2940		ug/Kg	☼	81	53 - 106	2	30
Phenol	41	U	3650	2560		ug/Kg	☼	70	41 - 100	8	30
Pyrene	80	U	3650	3040		ug/Kg	☼	83	39 - 130	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*77*		*59 - 110*
2-Fluorophenol (Surr)	*77*		*54 - 102*
Nitrobenzene-d5 (Surr)	*67*		*44 - 120*
Phenol-d5 (Surr)	*74*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404015/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/04/18 14:13	12/09/18 23:21	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-404015/1-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
Toxaphene	23	U	67	23	ug/Kg		12/04/18 14:13	12/09/18 23:21	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/04/18 14:13	12/09/18 23:21	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*111*		*72 - 115*	*12/04/18 14:13*	*12/09/18 23:21*	*1*
Tetrachloro-m-xylene	*98*		*71 - 111*	*12/04/18 14:13*	*12/09/18 23:21*	*1*

Lab Sample ID: LCS 160-404015/2-A
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	17.9		ug/Kg		107	72 - 117
4,4'-DDE	16.7	17.2		ug/Kg		103	75 - 104
4,4'-DDT	16.7	18.6		ug/Kg		111	72 - 119
Aldrin	16.7	16.7		ug/Kg		100	70 - 102
alpha-BHC	16.7	16.8		ug/Kg		101	72 - 111
alpha-Chlordane	16.7	16.9		ug/Kg		102	72 - 105
beta-BHC	16.7	21.0	o	ug/Kg		126	68 - 102
delta-BHC	16.7	17.8		ug/Kg		107	72 - 117
Dieldrin	16.7	17.4		ug/Kg		104	72 - 108
Endosulfan I	16.7	15.4		ug/Kg		92	34 - 96
Endosulfan II	16.7	15.1		ug/Kg		91	46 - 96
Endosulfan sulfate	16.7	16.9		ug/Kg		101	68 - 108
Endrin	16.7	17.2		ug/Kg		103	76 - 116
Endrin aldehyde	16.7	15.9		ug/Kg		95	54 - 97
Endrin ketone	16.7	17.7		ug/Kg		106	71 - 113
gamma-BHC (Lindane)	16.7	16.6		ug/Kg		99	71 - 107
Heptachlor	16.7	15.3		ug/Kg		92	55 - 128
Heptachlor epoxide	16.7	16.8		ug/Kg		101	72 - 107
Methoxychlor	16.7	19.0		ug/Kg		114	71 - 124
trans-Chlordane	16.7	16.9		ug/Kg		102	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*110*		*72 - 115*
Tetrachloro-m-xylene	*100*		*71 - 111*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32078-1 MS
Matrix: Soil
Analysis Batch: 404777

Client Sample ID: B3M454
Prep Type: Total/NA
Prep Batch: 404015

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.59	J P	18.1	16.1		ug/Kg	☼	86	60 - 121
4,4'-DDE	0.91	U	18.1	15.6		ug/Kg	☼	86	63 - 111
4,4'-DDT	0.68	U	18.1	17.1		ug/Kg	☼	95	59 - 122
Aldrin	0.62	U	18.1	16.1		ug/Kg	☼	89	57 - 110
alpha-BHC	0.42	U	18.1	16.8		ug/Kg	☼	93	62 - 117
alpha-Chlordane	3.0	P	18.1	19.1		ug/Kg	☼	89	58 - 114
beta-BHC	0.50	U o N	18.1	23.2	N	ug/Kg	☼	128	61 - 108
delta-BHC	0.37	U	18.1	17.4		ug/Kg	☼	96	64 - 121
Dieldrin	0.23	U	18.1	16.5		ug/Kg	☼	91	57 - 114
Endosulfan I	0.62	U	18.1	14.5		ug/Kg	☼	80	31 - 89
Endosulfan II	0.32	U	18.1	13.5		ug/Kg	☼	75	40 - 93
Endosulfan sulfate	0.37	U	18.1	15.2		ug/Kg	☼	84	56 - 112
Endrin	0.36	U	18.1	15.8		ug/Kg	☼	87	64 - 125
Endrin aldehyde	0.42	U	18.1	14.8		ug/Kg	☼	82	45 - 101
Endrin ketone	0.45	U	18.1	15.7		ug/Kg	☼	87	59 - 115
gamma-BHC (Lindane)	0.52	U	18.1	16.3		ug/Kg	☼	90	61 - 113
Heptachlor	0.31	U	18.1	15.4		ug/Kg	☼	85	33 - 150
Heptachlor epoxide	0.52	U	18.1	16.9		ug/Kg	☼	93	60 - 114
Methoxychlor	0.90	U	18.1	23.2		ug/Kg	☼	128	58 - 130
trans-Chlordane	2.9		18.1	18.8		ug/Kg	☼	88	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*96*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Lab Sample ID: 160-32078-1 MSD
Matrix: Soil
Analysis Batch: 404777

Client Sample ID: B3M454
Prep Type: Total/NA
Prep Batch: 404015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.59	J P	17.9	15.6		ug/Kg	☼	84	60 - 121	3	30
4,4'-DDE	0.91	U	17.9	16.1		ug/Kg	☼	90	63 - 111	3	30
4,4'-DDT	0.68	U	17.9	16.8		ug/Kg	☼	93	59 - 122	2	30
Aldrin	0.62	U	17.9	16.1		ug/Kg	☼	90	57 - 110	0	30
alpha-BHC	0.42	U	17.9	16.7		ug/Kg	☼	93	62 - 117	1	30
alpha-Chlordane	3.0	P	17.9	18.9		ug/Kg	☼	89	58 - 114	1	30
beta-BHC	0.50	U o N	17.9	23.6	N	ug/Kg	☼	132	61 - 108	2	30
delta-BHC	0.37	U	17.9	17.7		ug/Kg	☼	99	64 - 121	1	30
Dieldrin	0.23	U	17.9	16.3		ug/Kg	☼	91	57 - 114	1	30
Endosulfan I	0.62	U	17.9	14.1		ug/Kg	☼	79	31 - 89	3	30
Endosulfan II	0.32	U	17.9	12.7		ug/Kg	☼	71	40 - 93	6	30
Endosulfan sulfate	0.37	U	17.9	15.2		ug/Kg	☼	85	56 - 112	0	30
Endrin	0.36	U	17.9	15.5		ug/Kg	☼	86	64 - 125	2	30
Endrin aldehyde	0.42	U	17.9	14.5		ug/Kg	☼	81	45 - 101	2	30
Endrin ketone	0.45	U	17.9	15.3		ug/Kg	☼	86	59 - 115	2	30
gamma-BHC (Lindane)	0.52	U	17.9	16.2		ug/Kg	☼	91	61 - 113	0	30
Heptachlor	0.31	U	17.9	15.1		ug/Kg	☼	84	33 - 150	2	30
Heptachlor epoxide	0.52	U	17.9	16.6		ug/Kg	☼	93	60 - 114	2	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 404015**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methoxychlor	0.90	U	17.9	16.8	y	ug/Kg	☼	94	58 - 130	32	30
trans-Chlordane	2.9		17.9	18.7		ug/Kg	☼	88	62 - 114	0	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*95*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403983/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1248	11	U	33	11	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1254	13	U	33	13	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1260	10	U	33	10	ug/Kg		12/04/18 11:02	12/06/18 02:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*	*12/04/18 11:02*	*12/06/18 02:58*	*1*

Lab Sample ID: LCS 160-403983/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	156		ug/Kg		94	52 - 134
Aroclor 1260	167	162		ug/Kg		97	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	158		ug/Kg	☼	87	23 - 140
Aroclor 1260	11	U	181	135		ug/Kg	☼	75	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*75*		*23 - 146*

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
160-32078-17	B3M467	74	75	77	61	72	80
160-32078-18	B3M419	77	79	82	62	75	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404121/2-A	Lab Control Sample	77	75	75	73	73	80
MB 160-404121/1-A	Method Blank	67	74	75	63	69	77

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32078-1	B3M454	95	92
160-32078-1 MS	B3M454	96	92
160-32078-1 MSD	B3M454	95	92
160-32078-2	B3M470	102	93
160-32078-3	B3M450	99	93
160-32078-4	B3M462	96	88
160-32078-5	B3M458	95	86
160-32078-6	B3M466	93	88
160-32078-7	B3M438	94	93
160-32078-8	B3M434	109	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32078-9	B3M418	99	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404015/2-A	Lab Control Sample	110	100
MB 160-404015/1-A	Method Blank	111	98

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32078-1	B3M454	75
160-32078-1 MS	B3M454	75
160-32078-1 MSD	B3M454	77
160-32078-2	B3M470	81
160-32078-3	B3M450	73
160-32078-4	B3M462	80
160-32078-5	B3M458	78
160-32078-6	B3M466	77
160-32078-7	B3M438	82
160-32078-8	B3M434	82
160-32078-9	B3M418	75

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-403983/2-A	Lab Control Sample	89
MB 160-403983/1-A	Method Blank	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32124-1 MSD
Matrix: Soil
Analysis Batch: 405480

Client Sample ID: B3M423
Prep Type: Total/NA
Prep Batch: 404561

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diphenylamine + N-Nitrosodiphenylamine	36	U	3580	3640		ug/Kg	☼	102	33 - 140	2	30
Fluoranthene	54	U	3580	3050		ug/Kg	☼	85	45 - 109	0	30
Fluorene	49	U	3580	2970		ug/Kg	☼	83	45 - 109	2	30
Hexachlorobenzene	45	U	3580	3090		ug/Kg	☼	86	48 - 113	3	30
Hexachlorobutadiene	43	U	3580	2980		ug/Kg	☼	83	48 - 109	1	30
Hexachlorocyclopentadiene	350	U	3580	2580		ug/Kg	☼	72	21 - 144	2	30
Hexachloroethane	37	U	3580	2590		ug/Kg	☼	72	44 - 102	4	30
Indeno[1,2,3-cd]pyrene	68	U	3580	3760		ug/Kg	☼	105	30 - 136	7	30
Isophorone	40	U	3580	2470		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	38	U	3580	2880		ug/Kg	☼	80	54 - 98	2	30
Nitrobenzene	43	U	3580	2740		ug/Kg	☼	76	51 - 106	4	30
N-Nitrosodi-n-propylamine	43	U	3580	2680		ug/Kg	☼	75	47 - 104	0	30
Pentachlorophenol	350	U	3580	2750		ug/Kg	☼	77	23 - 116	4	30
Phenanthrene	45	U	3580	3080		ug/Kg	☼	86	53 - 106	1	30
Phenol	40	U	3580	2660		ug/Kg	☼	74	41 - 100	1	30
Pyrene	78	U	3580	3010		ug/Kg	☼	84	39 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*47 - 125*
2-Fluorobiphenyl (Surr)	*87*		*59 - 110*
2-Fluorophenol (Surr)	*84*		*54 - 102*
Nitrobenzene-d5 (Surr)	*76*		*44 - 120*
Phenol-d5 (Surr)	*76*		*51 - 104*
Terphenyl-d14 (Surr)	*86*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-404463/1-A
Matrix: Solid
Analysis Batch: 407098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404463

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-404463/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
Toxaphene	23	U	67	23	ug/Kg		12/06/18 12:48	12/21/18 16:38	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/06/18 12:48	12/21/18 16:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*84*		*72 - 115*	*12/06/18 12:48*	*12/21/18 16:38*	*1*
Tetrachloro-m-xylene	*83*		*71 - 111*	*12/06/18 12:48*	*12/21/18 16:38*	*1*

Lab Sample ID: LCS 160-404463/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	12.5		ug/Kg		75	72 - 117
4,4'-DDE	16.7	13.2		ug/Kg		79	75 - 104
4,4'-DDT	16.7	13.6		ug/Kg		82	72 - 119
Aldrin	16.7	12.7		ug/Kg		76	70 - 102
alpha-BHC	16.7	13.3		ug/Kg		80	72 - 111
alpha-Chlordane	16.7	13.0		ug/Kg		78	72 - 105
beta-BHC	16.7	12.3		ug/Kg		74	68 - 102
delta-BHC	16.7	13.5		ug/Kg		81	72 - 117
Dieldrin	16.7	13.3		ug/Kg		79	72 - 108
Endosulfan I	16.7	11.7		ug/Kg		70	34 - 96
Endosulfan II	16.7	11.9		ug/Kg		71	46 - 96
Endosulfan sulfate	16.7	11.3		ug/Kg		68	68 - 108
Endrin	16.7	12.5	o	ug/Kg		75	76 - 116
Endrin aldehyde	16.7	11.4		ug/Kg		68	54 - 97
Endrin ketone	16.7	12.5		ug/Kg		75	71 - 113
gamma-BHC (Lindane)	16.7	13.0		ug/Kg		78	71 - 107
Heptachlor	16.7	12.4		ug/Kg		74	55 - 128
Heptachlor epoxide	16.7	13.0		ug/Kg		78	72 - 107
Methoxychlor	16.7	12.6		ug/Kg		75	71 - 124
trans-Chlordane	16.7	13.1		ug/Kg		78	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*80*		*72 - 115*
Tetrachloro-m-xylene	*80*		*71 - 111*

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.37	U	17.9	11.8		ug/Kg	☼	66	60 - 121
4,4'-DDE	0.90	U	17.9	13.6		ug/Kg	☼	76	63 - 111

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.67	U	17.9	13.6		ug/Kg	☼	76	59 - 122
Aldrin	0.61	U	17.9	12.6		ug/Kg	☼	70	57 - 110
alpha-BHC	0.42	U	17.9	13.4		ug/Kg	☼	75	62 - 117
alpha-Chlordane	4.1	P	17.9	17.1		ug/Kg	☼	73	58 - 114
beta-BHC	0.49	U	17.9	12.4		ug/Kg	☼	70	61 - 108
delta-BHC	0.37	U	17.9	13.8		ug/Kg	☼	77	64 - 121
Dieldrin	0.23	U	17.9	13.1		ug/Kg	☼	73	57 - 114
Endosulfan I	0.61	U	17.9	11.8		ug/Kg	☼	66	31 - 89
Endosulfan II	0.31	U	17.9	12.4		ug/Kg	☼	69	40 - 93
Endosulfan sulfate	0.36	U	17.9	10.5		ug/Kg	☼	58	56 - 112
Endrin	0.36	U o	17.9	12.3		ug/Kg	☼	69	64 - 125
Endrin aldehyde	0.42	U	17.9	11.0		ug/Kg	☼	61	45 - 101
Endrin ketone	0.45	U	17.9	11.8		ug/Kg	☼	66	59 - 115
gamma-BHC (Lindane)	0.51	U	17.9	13.0		ug/Kg	☼	73	61 - 113
Heptachlor	0.30	U	17.9	12.3		ug/Kg	☼	69	33 - 150
Heptachlor epoxide	0.51	U	17.9	14.0		ug/Kg	☼	78	60 - 114
Methoxychlor	0.89	U	17.9	11.9		ug/Kg	☼	67	58 - 130
trans-Chlordane	4.2		17.9	16.6		ug/Kg	☼	69	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*72 - 115*
Tetrachloro-m-xylene	*76*		*71 - 111*

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407098 — **Prep Batch: 404463**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.37	U	17.9	12.3		ug/Kg	☼	69	60 - 121	5	30
4,4'-DDE	0.90	U	17.9	14.2		ug/Kg	☼	79	63 - 111	5	30
4,4'-DDT	0.67	U	17.9	13.7		ug/Kg	☼	77	59 - 122	1	30
Aldrin	0.61	U	17.9	13.3		ug/Kg	☼	75	57 - 110	6	30
alpha-BHC	0.42	U	17.9	14.2		ug/Kg	☼	79	62 - 117	6	30
alpha-Chlordane	4.1	P	17.9	18.0		ug/Kg	☼	78	58 - 114	5	30
beta-BHC	0.49	U	17.9	13.0		ug/Kg	☼	73	61 - 108	4	30
delta-BHC	0.37	U	17.9	14.2		ug/Kg	☼	80	64 - 121	3	30
Dieldrin	0.23	U	17.9	13.8		ug/Kg	☼	77	57 - 114	5	30
Endosulfan I	0.61	U	17.9	12.4		ug/Kg	☼	69	31 - 89	5	30
Endosulfan II	0.31	U	17.9	13.1		ug/Kg	☼	73	40 - 93	5	30
Endosulfan sulfate	0.36	U	17.9	11.2		ug/Kg	☼	62	56 - 112	7	30
Endrin	0.36	U o	17.9	12.9		ug/Kg	☼	72	64 - 125	5	30
Endrin aldehyde	0.42	U	17.9	11.4		ug/Kg	☼	64	45 - 101	4	30
Endrin ketone	0.45	U	17.9	12.2		ug/Kg	☼	68	59 - 115	3	30
gamma-BHC (Lindane)	0.51	U	17.9	13.6		ug/Kg	☼	76	61 - 113	5	30
Heptachlor	0.30	U	17.9	13.3		ug/Kg	☼	74	33 - 150	8	30
Heptachlor epoxide	0.51	U	17.9	14.6		ug/Kg	☼	82	60 - 114	5	30
Methoxychlor	0.89	U	17.9	12.1		ug/Kg	☼	68	58 - 130	2	30
trans-Chlordane	4.2		17.9	17.3		ug/Kg	☼	73	62 - 114	5	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		72 - 115
Tetrachloro-m-xylene	80		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404502/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1248	11	U	33	11	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1254	13	U	33	13	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1260	10	U	33	10	ug/Kg		12/06/18 15:50	12/10/18 17:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/06/18 15:50	12/10/18 17:05	1

Lab Sample ID: LCS 160-404502/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	152		ug/Kg		91	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	179	147		ug/Kg	☼	82	23 - 140
Aroclor 1260	11	U	179	158		ug/Kg	☼	88	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	79		23 - 146

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	179	155		ug/Kg	☼	86	23 - 140	5	30
Aroclor 1260	11	U	179	147		ug/Kg	☼	82	20 - 131	7	30

2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-404561/2-A	Lab Control Sample	82	85	77	74	73	91
MB 160-404561/1-A	Method Blank	61	74	71	60	64	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32124-8	B3M442	88	82
160-32124-8 MS	B3M442	81	76
160-32124-8 MSD	B3M442	88	80
160-32124-9	B3M430	89	80
160-32124-10	B3M446	80	78
160-32124-11	B3M414	83	79
160-32124-12	B3M422	93	86
160-32124-13	B3M426	85	78

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404463/2-A	Lab Control Sample	80	80
MB 160-404463/1-A	Method Blank	84	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-32192-2 MSD
Matrix: Soil
Analysis Batch: 406086

Client Sample ID: B3MMR4
Prep Type: Total/NA
Prep Batch: 405450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluorene	46	U	3310	2810		ug/Kg	☼	85	45 - 109	3	30
Hexachlorobenzene	42	U	3310	2900		ug/Kg	☼	88	48 - 113	5	30
Hexachlorobutadiene	40	U	3310	2640		ug/Kg	☼	80	48 - 109	1	30
Hexachlorocyclopentadiene	330	U	3310	2310		ug/Kg	☼	70	21 - 144	2	30
Hexachloroethane	35	U	3310	2350		ug/Kg	☼	71	44 - 102	5	30
Indeno[1,2,3-cd]pyrene	63	U	3310	2920		ug/Kg	☼	88	30 - 136	5	30
Isophorone	37	U	3310	2270		ug/Kg	☼	69	48 - 100	2	30
Naphthalene	35	U	3310	2620		ug/Kg	☼	79	54 - 98	3	30
Nitrobenzene	40	U	3310	2560		ug/Kg	☼	77	51 - 106	4	30
N-Nitrosodi-n-propylamine	40	U	3310	2600		ug/Kg	☼	79	47 - 104	3	30
Pentachlorophenol	330	U	3310	2740		ug/Kg	☼	83	23 - 116	10	30
Phenanthrene	42	U	3310	2840		ug/Kg	☼	86	53 - 106	4	30
Phenol	38	U	3310	2550		ug/Kg	☼	77	41 - 100	1	30
Pyrene	73	U	3310	2880		ug/Kg	☼	87	39 - 130	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*47 - 125*
2-Fluorobiphenyl (Surr)	*83*		*59 - 110*
2-Fluorophenol (Surr)	*87*		*54 - 102*
Nitrobenzene-d5 (Surr)	*75*		*44 - 120*
Phenol-d5 (Surr)	*78*		*51 - 104*
Terphenyl-d14 (Surr)	*89*		*59 - 98*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 160-406865/1-A
Matrix: Solid
Analysis Batch: 408356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.35	U	1.7	0.35	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDE	0.84	U	1.7	0.84	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
4,4'-DDT	0.63	U	1.7	0.63	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Aldrin	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-BHC	0.39	U	2.0	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
alpha-Chlordane	0.94	U	1.7	0.94	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
beta-BHC	0.46	U	1.7	0.46	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
delta-BHC	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Dieldrin	0.22	U	1.7	0.22	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan I	0.57	U	1.7	0.57	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan II	0.29	U	1.7	0.29	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endosulfan sulfate	0.34	U	1.7	0.34	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin	0.33	U	1.7	0.33	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin aldehyde	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Endrin ketone	0.42	U	1.7	0.42	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
gamma-BHC (Lindane)	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor	0.28	U	2.0	0.28	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Heptachlor epoxide	0.48	U	1.7	0.48	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: MB 160-406865/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methoxychlor	0.83	U	3.3	0.83	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
Toxaphene	23	U	67	23	ug/Kg		12/20/18 11:36	12/31/18 20:13	1
trans-Chlordane	0.39	U	1.7	0.39	ug/Kg		12/20/18 11:36	12/31/18 20:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*98*		*72 - 115*	*12/20/18 11:36*	*12/31/18 20:13*	*1*
Tetrachloro-m-xylene	*88*		*71 - 111*	*12/20/18 11:36*	*12/31/18 20:13*	*1*

Lab Sample ID: LCS 160-406865/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	16.7	15.3		ug/Kg		92	72 - 117
4,4'-DDE	16.7	14.2		ug/Kg		85	75 - 104
4,4'-DDT	16.7	15.3		ug/Kg		92	72 - 119
Aldrin	16.7	14.0		ug/Kg		84	70 - 102
alpha-BHC	16.7	14.7		ug/Kg		88	72 - 111
alpha-Chlordane	16.7	14.3		ug/Kg		86	72 - 105
beta-BHC	16.7	14.1		ug/Kg		85	68 - 102
delta-BHC	16.7	15.5		ug/Kg		93	72 - 117
Dieldrin	16.7	14.7		ug/Kg		88	72 - 108
Endosulfan I	16.7	11.6		ug/Kg		69	34 - 96
Endosulfan II	16.7	13.4		ug/Kg		80	46 - 96
Endosulfan sulfate	16.7	14.0		ug/Kg		84	68 - 108
Endrin	16.7	14.3		ug/Kg		86	76 - 116
Endrin aldehyde	16.7	14.6		ug/Kg		87	54 - 97
Endrin ketone	16.7	15.3		ug/Kg		92	71 - 113
gamma-BHC (Lindane)	16.7	14.3		ug/Kg		86	71 - 107
Heptachlor	16.7	13.8		ug/Kg		83	55 - 128
Heptachlor epoxide	16.7	14.3		ug/Kg		86	72 - 107
Methoxychlor	16.7	14.9		ug/Kg		89	71 - 124
trans-Chlordane	16.7	14.3		ug/Kg		86	71 - 108

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*102*		*72 - 115*
Tetrachloro-m-xylene	*86*		*71 - 111*

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.35	U	16.4	14.0		ug/Kg	☼	85	60 - 121
4,4'-DDE	0.84	U	16.4	12.4		ug/Kg	☼	75	63 - 111
4,4'-DDT	0.63	U	16.4	13.4		ug/Kg	☼	81	59 - 122
Aldrin	0.57	U	16.4	11.5		ug/Kg	☼	70	57 - 110
alpha-BHC	0.39	U	16.4	11.6		ug/Kg	☼	71	62 - 117

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
alpha-Chlordane	0.94	U	16.4	12.7		ug/Kg	☼	77	58 - 114
beta-BHC	0.46	U	16.4	11.8		ug/Kg	☼	72	61 - 108
delta-BHC	0.34	U	16.4	13.6		ug/Kg	☼	83	64 - 121
Dieldrin	0.21	U	16.4	13.4		ug/Kg	☼	82	57 - 114
Endosulfan I	0.57	U	16.4	10.6		ug/Kg	☼	65	31 - 89
Endosulfan II	0.29	U	16.4	12.9		ug/Kg	☼	79	40 - 93
Endosulfan sulfate	0.34	U	16.4	12.6		ug/Kg	☼	77	56 - 112
Endrin	0.33	U	16.4	13.2		ug/Kg	☼	81	64 - 125
Endrin aldehyde	0.39	U	16.4	12.8		ug/Kg	☼	78	45 - 101
Endrin ketone	0.42	U	16.4	13.4		ug/Kg	☼	81	59 - 115
gamma-BHC (Lindane)	0.48	U	16.4	12.0		ug/Kg	☼	73	61 - 113
Heptachlor	0.28	U	16.4	11.3		ug/Kg	☼	69	33 - 150
Heptachlor epoxide	0.47	U	16.4	12.7		ug/Kg	☼	78	60 - 114
Methoxychlor	0.82	U	16.4	12.5		ug/Kg	☼	76	58 - 130
trans-Chlordane	0.38	U	16.4	12.9		ug/Kg	☼	79	62 - 114

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*81*		*72 - 115*
Tetrachloro-m-xylene	*63*	*X*	*71 - 111*

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408356 — **Prep Batch: 406865**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.35	U	16.6	15.6		ug/Kg	☼	94	60 - 121	11	30
4,4'-DDE	0.84	U	16.6	14.3		ug/Kg	☼	86	63 - 111	14	30
4,4'-DDT	0.63	U	16.6	15.5		ug/Kg	☼	93	59 - 122	15	30
Aldrin	0.57	U	16.6	13.3		ug/Kg	☼	80	57 - 110	15	30
alpha-BHC	0.39	U	16.6	13.7		ug/Kg	☼	82	62 - 117	17	30
alpha-Chlordane	0.94	U	16.6	14.5		ug/Kg	☼	87	58 - 114	13	30
beta-BHC	0.46	U	16.6	13.6		ug/Kg	☼	82	61 - 108	14	30
delta-BHC	0.34	U	16.6	15.8		ug/Kg	☼	95	64 - 121	15	30
Dieldrin	0.21	U	16.6	15.2		ug/Kg	☼	92	57 - 114	12	30
Endosulfan I	0.57	U	16.6	12.0		ug/Kg	☼	72	31 - 89	13	30
Endosulfan II	0.29	U	16.6	14.1		ug/Kg	☼	85	40 - 93	9	30
Endosulfan sulfate	0.34	U	16.6	14.5		ug/Kg	☼	87	56 - 112	14	30
Endrin	0.33	U	16.6	15.1		ug/Kg	☼	91	64 - 125	13	30
Endrin aldehyde	0.39	U	16.6	14.2		ug/Kg	☼	86	45 - 101	10	30
Endrin ketone	0.42	U	16.6	15.0		ug/Kg	☼	90	59 - 115	12	30
gamma-BHC (Lindane)	0.48	U	16.6	13.9		ug/Kg	☼	84	61 - 113	15	30
Heptachlor	0.28	U	16.6	13.1		ug/Kg	☼	79	33 - 150	15	30
Heptachlor epoxide	0.47	U	16.6	14.6		ug/Kg	☼	88	60 - 114	14	30
Methoxychlor	0.82	U	16.6	13.8		ug/Kg	☼	83	58 - 130	10	30
trans-Chlordane	0.38	U	16.6	14.8		ug/Kg	☼	89	62 - 114	14	30

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32192-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3MMR3
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	73		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32192-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3MMR3
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.5	U	166	143		ug/Kg	☼	86	23 - 140
Aroclor 1260	9.8	U	166	155		ug/Kg	☼	93	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32192-1	B3MMR3	75	64 X
160-32192-1 MS	B3MMR3	81	63 X
160-32192-1 MSD	B3MMR3	92	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32192-1	B3MMR3	84
160-32192-1 MS	B3MMR3	81
160-32192-1 MSD	B3MMR3	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: PCBs - Sample Data Groups (SDGs) SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3MMP5	11/15/18	Soil	C	8082A
B3MMP9	11/26/18	Soil	C	8082A
B3M454	11/29/18	Soil	C	8082A
B3M470	11/29/18	Soil	C	8082A
B3M450	11/29/18	Soil	C	8082A
B3M462	11/29/18	Soil	C	8082A
B3M458	11/29/18	Soil	C	8082A
B3M466	11/29/18	Soil	C	8082A
B3M438	11/29/18	Soil	C	8082A
B3M434	11/29/18	Soil	C	8082A
B3M418	11/29/18	Soil	C	8082A
B3M442	12/03/18	Soil	C	8082A
B3M430	12/03/18	Soil	C	8082A
B3M446	12/03/18	Soil	C	8082A
B3M414	12/03/18	Soil	C	8082A
B3M422	12/03/18	Soil	C	8082A
B3M426	12/03/18	Soil	C	8082A
B3MMR3	12/06/18	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable. It should be noted that method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. It should be noted that method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for aroclor 1016, aroclor 1254 and aroclor 1260 were met. CRDLs for other PCBs were not provided in the SAP.

- **Completeness**

SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDGs: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-016		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 01/16/19	
			SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8082 (TCLP)		
SAMPLES/MATRIX Soil					
SDG SL31919-1: B3MMP5					
SDG SL32018-1: B3MMP9					
SDG SL32078-1: B3M454, B3M470, B3M450, B3M462, B3M458, B3M466, B3M438, B3M434, B3M418					
SDG SL32124-1: B3M442, B3M430, B3M446, B3M414, B3M422, B3M426					

SDG SL32192-1: B3MMR3

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A
DDT and endrin breakdowns acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	Yes No N/A
Surrogate recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?	Yes No N/A
Positive results resolved acceptably?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs for aroclor 1016, aroclor 1254 and aroclor 1260 were met. CRDL for other PCB analytes were not provided.

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-31887-C-5-C MSD
Matrix: Solid
Analysis Batch: 404777

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 402188

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endosulfan sulfate	0.35	U	17.4	13.9		ug/Kg	☼	80	56 - 112	11	30
Endrin	0.35	U	17.4	14.5		ug/Kg	☼	84	64 - 125	12	30
Endrin aldehyde	0.41	U	17.4	13.5		ug/Kg	☼	78	45 - 101	11	30
Endrin ketone	0.44	U	17.4	14.2		ug/Kg	☼	82	59 - 115	13	30
gamma-BHC (Lindane)	0.50	U	17.4	15.0		ug/Kg	☼	86	61 - 113	9	30
Heptachlor	0.30	U	17.4	14.1		ug/Kg	☼	81	33 - 150	12	30
Heptachlor epoxide	0.50	U	17.4	15.0		ug/Kg	☼	86	60 - 114	11	30
Methoxychlor	0.86	U	17.4	14.9		ug/Kg	☼	86	58 - 130	13	30
trans-Chlordane	0.90	J	17.4	15.6		ug/Kg	☼	85	62 - 114	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*92*		*72 - 115*
Tetrachloro-m-xylene	*89*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-402292/1-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1248	11	U	33	11	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1254	13	U	33	13	ug/Kg		11/21/18 16:13	12/03/18 18:08	1
Aroclor 1260	10	U	33	10	ug/Kg		11/21/18 16:13	12/03/18 18:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*94*		*23 - 146*	*11/21/18 16:13*	*12/03/18 18:08*	*1*

Lab Sample ID: LCS 160-402292/2-A
Matrix: Solid
Analysis Batch: 403930

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402292

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	135		ug/Kg		81	52 - 134
Aroclor 1260	167	145		ug/Kg		87	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31887-C-6-C MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*82*		*23 - 146*

Lab Sample ID: 160-31887-C-6-D MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-402141/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4	U	9.8	2.4	mg/Kg		11/21/18 12:35	12/05/18 14:33	1
Lithium	1.5	U	4.9	1.5	mg/Kg		11/21/18 12:35	12/05/18 14:33	1

Lab Sample ID: LCS 160-402141/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.43	8.73		mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-402141/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.44	D	mg/Kg		86.7	53.5 - 124.5

Lab Sample ID: 160-31919-1 MS — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	17.8	17.82		mg/Kg	☼	100	75 - 125

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-402691/2-A	Lab Control Sample	82	84	82	79	82	80
MB 160-402691/1-A	Method Blank	69	79	79	69	78	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31919-1	B3MMP5	92	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-31887-C-5-B MS	Matrix Spike	97	95
160-31887-C-5-C MSD	Matrix Spike Duplicate	92	89
LCS 160-402188/2-A	Lab Control Sample	104	99
MB 160-402188/1-A	Method Blank	105	95

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-31919-1	B3MMP5	74

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-31919-1
SDG: SL31919-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**							
160-31887-C-6-C MS	Matrix Spike	82							
160-31887-C-6-D MSD	Matrix Spike Duplicate	87							
LCS 160-402292/2-A	Lab Control Sample	90							
MB 160-402292/1-A	Method Blank	94							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		72 - 115
Tetrachloro-m-xylene	77		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403415/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1248	11	U	33	11	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1254	13	U	33	13	ug/Kg		11/29/18 12:02	12/13/18 17:12	1
Aroclor 1260	10	U	33	10	ug/Kg		11/29/18 12:02	12/13/18 17:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	83		23 - 146	11/29/18 12:02	12/13/18 17:12	1

Lab Sample ID: LCS 160-403415/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	154		ug/Kg		93	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		23 - 146

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.6	U	166	149		ug/Kg	☼	90	23 - 140
Aroclor 1260	9.9	U	166	147		ug/Kg	☼	88	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	86		23 - 146

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.6	U	166	147		ug/Kg	☼	88	23 - 140	2	30
Aroclor 1260	9.9	U	166	146		ug/Kg	☼	88	20 - 131	1	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*83*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-403833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1

Lab Sample ID: LCS 160-403833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.59	8.82		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-403833/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.54	D	mg/Kg		82.5	53.5 - 124.5

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	19.4	19.32		mg/Kg	☼	100	75 - 125
Lithium	1.5	U	9.68	9.89		mg/Kg	☼	102	75 - 125

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.4	U	18.9	18.61		mg/Kg	☼	99	75 - 125	4	30
Lithium	1.5	U	9.44	9.48		mg/Kg	☼	100	75 - 125	4	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-403615/2-A	Lab Control Sample	77	82	82	80	84	86
MB 160-403615/1-A	Method Blank	68	81	80	70	80	87

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32018-2	B3MMP9	79	75
160-32018-2 MS	B3MMP9	85	72
160-32018-2 MSD	B3MMP9	81	77

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-403441/2-A	Lab Control Sample	90	86
MB 160-403441/1-A	Method Blank	90	87

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB2
Lab Sample ID	Client Sample ID	(23-146)
160-32018-2	B3MMP9	94
160-32018-2 MS	B3MMP9	86
160-32018-2 MSD	B3MMP9	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB2 (23-146)**							
LCS 160-403415/2-A	Lab Control Sample	92							
MB 160-403415/1-A	Method Blank	83							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404777 — **Prep Batch: 404015**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methoxychlor	0.90	U	17.9	16.8	y	ug/Kg	☼	94	58 - 130	32	30
trans-Chlordane	2.9		17.9	18.7		ug/Kg	☼	88	62 - 114	0	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*95*		*72 - 115*
Tetrachloro-m-xylene	*92*		*71 - 111*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-403983/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1248	11	U	33	11	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1254	13	U	33	13	ug/Kg		12/04/18 11:02	12/06/18 02:58	1
Aroclor 1260	10	U	33	10	ug/Kg		12/04/18 11:02	12/06/18 02:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*90*		*23 - 146*	*12/04/18 11:02*	*12/06/18 02:58*	*1*

Lab Sample ID: LCS 160-403983/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	156		ug/Kg		94	52 - 134
Aroclor 1260	167	162		ug/Kg		97	50 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	181	158		ug/Kg	☼	87	23 - 140
Aroclor 1260	11	U	181	135		ug/Kg	☼	75	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*75*		*23 - 146*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	181	164		ug/Kg	☼	91	23 - 140	4	30
Aroclor 1260	11	U	181	146		ug/Kg	☼	81	20 - 131	8	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*77*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404219/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/05/18 12:07	12/11/18 14:29	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/05/18 12:07	12/11/18 14:29	1

Lab Sample ID: LCS 160-404219/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.84	9.88		mg/Kg		100	80 - 120

Lab Sample ID: LCSSRM 160-404219/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.48	D	mg/Kg		86.8	53.5 - 124.5

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.8	U D N	21.1	9.17	B D N	mg/Kg	☼	43	75 - 125
Lithium	5.5	B D	10.6	16.40	D	mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.8	U D N	20.6	7.07	B D N	mg/Kg	☼	34	75 - 125	26	30
Lithium	5.5	B D	10.3	16.62	D	mg/Kg	☼	108	75 - 125	1	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX1
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32078-9	B3M418	99	86

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-404015/2-A	Lab Control Sample	110	100
MB 160-404015/1-A	Method Blank	111	98

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32078-1	B3M454	75
160-32078-1 MS	B3M454	75
160-32078-1 MSD	B3M454	77
160-32078-2	B3M470	81
160-32078-3	B3M450	73
160-32078-4	B3M462	80
160-32078-5	B3M458	78
160-32078-6	B3M466	77
160-32078-7	B3M438	82
160-32078-8	B3M434	82
160-32078-9	B3M418	75

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
LCS 160-403983/2-A	Lab Control Sample	89
MB 160-403983/1-A	Method Blank	90

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	88		72 - 115
Tetrachloro-m-xylene	80		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-404502/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1248	11	U	33	11	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1254	13	U	33	13	ug/Kg		12/06/18 15:50	12/10/18 17:05	1
Aroclor 1260	10	U	33	10	ug/Kg		12/06/18 15:50	12/10/18 17:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/06/18 15:50	12/10/18 17:05	1

Lab Sample ID: LCS 160-404502/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	157		ug/Kg		94	52 - 134
Aroclor 1260	167	152		ug/Kg		91	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	179	147		ug/Kg	☼	82	23 - 140
Aroclor 1260	11	U	179	158		ug/Kg	☼	88	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	79		23 - 146

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	179	155		ug/Kg	☼	86	23 - 140	5	30
Aroclor 1260	11	U	179	147		ug/Kg	☼	82	20 - 131	7	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*73*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.2	U D N	18.7	5.09	B D N	mg/Kg	☼	27	75 - 125
Lithium	5.6	B D	9.35	15.52	D	mg/Kg	☼	106	75 - 125

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.2	U D N	19.5	5.28	B D N	mg/Kg	☼	27	75 - 125	4	30
Lithium	5.6	B D	9.73	16.16	D	mg/Kg	☼	109	75 - 125	4	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32124-1
SDG: SL32124-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
160-32124-8	B3M442	79							
160-32124-8 MS	B3M442	79							
160-32124-8 MSD	B3M442	73							
160-32124-9	B3M430	79							
160-32124-10	B3M446	82							
160-32124-11	B3M414	77							
160-32124-12	B3M422	86							
160-32124-13	B3M426	88							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
LCS 160-404502/2-A	Lab Control Sample	81							
MB 160-404502/1-A	Method Blank	89							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 160-32192-1 MSD
Matrix: Soil
Analysis Batch: 408356

Client Sample ID: B3MMR3
Prep Type: Total/NA
Prep Batch: 406865

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	92		72 - 115
Tetrachloro-m-xylene	73		71 - 111

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 160-405132/1-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor 1016	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1221	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1232	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1242	9.6	U	33	9.6	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1248	11	U	33	11	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1254	13	U	33	13	ug/Kg		12/11/18 17:20	12/19/18 18:01	1
Aroclor 1260	10	U	33	10	ug/Kg		12/11/18 17:20	12/19/18 18:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	89		23 - 146	12/11/18 17:20	12/19/18 18:01	1

Lab Sample ID: LCS 160-405132/2-A
Matrix: Solid
Analysis Batch: 406765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	167	144		ug/Kg		86	52 - 134
Aroclor 1260	167	170		ug/Kg		102	50 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	93		23 - 146

Lab Sample ID: 160-32192-1 MS
Matrix: Soil
Analysis Batch: 406765

Client Sample ID: B3MMR3
Prep Type: Total/NA
Prep Batch: 405132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	9.5	U	166	143		ug/Kg	☼	86	23 - 140
Aroclor 1260	9.8	U	166	155		ug/Kg	☼	93	20 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	81		23 - 146

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.5	U	166	139		ug/Kg	☼	83	23 - 140	3	30
Aroclor 1260	9.8	U	166	159		ug/Kg	☼	96	20 - 131	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406598/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.7	2.2	mg/Kg		12/19/18 10:26	12/27/18 19:22	1
Lithium	1.3	U	4.3	1.3	mg/Kg		12/19/18 10:26	12/27/18 19:22	1

Lab Sample ID: LCS 160-406598/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.46	9.34		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406598/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.82	D	mg/Kg		83.9	53.5 - 124.5

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	19.2	18.39		mg/Kg	☼	96	75 - 125
Lithium	1.4	U	9.61	10.50		mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.4	U	19.8	20.09		mg/Kg	☼	101	75 - 125	9	30
Lithium	1.4	U	9.92	11.06		mg/Kg	☼	112	75 - 125	5	30

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(47-125)	(59-110)	(54-102)	(44-120)	(51-104)	(59-98)
LCS 160-405450/2-A	Lab Control Sample	89	84	86	77	76	91
MB 160-405450/1-A	Method Blank	70	77	79	67	74	83

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
160-32192-1	B3MMR3	75	64 X
160-32192-1 MS	B3MMR3	81	63 X
160-32192-1 MSD	B3MMR3	92	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB2	TCX2
Lab Sample ID	Client Sample ID	(72-115)	(71-111)
LCS 160-406865/2-A	Lab Control Sample	102	86
MB 160-406865/1-A	Method Blank	98	88

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Soil **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCB1
Lab Sample ID	Client Sample ID	(23-146)
160-32192-1	B3MMR3	84
160-32192-1 MS	B3MMR3	81
160-32192-1 MSD	B3MMR3	89

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCB1 (23-146)**							
LCS 160-405132/2-A	Lab Control Sample	93							
MB 160-405132/1-A	Method Blank	89							

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Metals - Sample Data Groups (SDGs) SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 prepared by TestAmerica Laboratories Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3MMP5	11/15/18	Soil	C	6010D, 6020B, 7471B
B3MMP9	11/26/18	Soil	C	6010D, 6020B, 7471B
B3M454	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M470	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M450	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M462	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M458	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M466	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M438	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M434	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M418	11/29/18	Soil	C	6010D, 6020B, 7471B
B3M442	12/03/18	Soil	C	6010D, 6020B, 7471B
B3M430	12/03/18	Soil	C	6010D, 6020B, 7471B
B3M446	12/03/18	Soil	C	6010D, 6020B, 7471B
B3M414	12/03/18	Soil	C	6010D, 6020B, 7471B
B3M422	12/03/18	Soil	C	6010D, 6020B, 7471B
B3M426	12/03/18	Soil	C	6010D, 6020B, 7471B
B3MMR3	12/06/18	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP and ICPMS metals are analysis within 180 days of sample collection and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation for all analytes requires chilling to <6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG SL31919-1, the Ni laboratory blank result was a detect > the method detection limit (MDL) but < the practical quantitation limit (PQL). The Ni result for sample B3MMP5 was a non-detect and should not be qualified as a result.

For SDG SL32124-1, the Pb and Hg laboratory blank results were detects > the MDL but < the PQL. All associated Pb sample results were detects >20X the blank value and should not be qualified as a result. The Hg results for samples B3M442, B3M446, B3M414, B3M422 and B3M426 were detects > the MDL but ≤ the PQL, therefore should be qualified as estimates and flagged "J+."

For SDG SL32192-1, the Sb laboratory blank result was a detect > the MDL but < the PQL. The Sb result for sample B3MMR3 was a non-detect and should not be qualified as a result.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample and ICP-AES interference check sample results. According to the SAP, the laboratory control sample and the matrix spike accuracy limits are 70% to 130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG SL32078-1
The MS and MSD recoveries for B were below the lower acceptance limit but ≥30% and PDS information was not available. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit and according to the case narrative; the PDS was outside acceptance limit. All associated sample results were detects; therefore all Mn sample results should be qualified as estimates and flagged "J+." The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified as a result. See the table in Appendix 2 for a listing of affected samples.

SDG SL32124-1
The MS and MSD recoveries for B were <30%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and MSD recoveries for Al and Mn were above the upper acceptance limit and no PDS information was available. All associated sample results were detects; therefore all Mn sample results should be qualified as estimates and flagged "J+." The parent sample result for Al was >4X the spike concentration; therefore data should not be qualified as a result. See the table in Appendix 2 for a listing of affected samples.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were met. No other CRDLs were provided.

- **Completeness**

SDGs SL31919-1, SL32018-1, SL32078-1, SL32124-1 and SL32192-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 98.8%.

MAJOR DEFICIENCIES

A major deficiency leading to qualification of B results as unusable was due to very low matrix spike recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to laboratory blank and matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDGs: SL31919-1, SL32018-1, SL32078-1, SL32124-1, SL32192-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Hg	J+	B3M442, B3M446, B3M414, B3M422, B3M426	Laboratory blank contamination
B	UJ	B3M454, B3M470, B3M450, B3M462, B3M458, B3M466, B3M438, B3M434, B3M418	Low matrix spike recoveries
Mn	J+	B3M454, B3M470, B3M450, B3M462, B3M458, B3M466, B3M438, B3M434, B3M418, B3M442, B3M430, B3M446, B3M414, B3M422, B3M426	High matrix spike recoveries
B	UR	B3M442, B3M430, B3M446, B3M414, B3M422, B3M426	Very low matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-016		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE:	
			SDG: SL31919-1, SL32018-1, SL32078-1, SL32124-1. SL32192-1		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
SDG SL31919-1: B3MMP5					
SDG SL32018-1: B3MMP9					
SDG SL32078-1: B3M454, B3M470, B3M450, B3M462, B3M458, B3M466, B3M438, B3M434, B3M418					
SDG SL32124-1: B3M442, B3M430, B3M446, B3M414, B3M422, B3M426					
SDG SL32192-1: B3MMR3					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
ICP interference checks acceptable?	Yes No N/A
ICV and CCV checks performed on all instruments?	Yes No N/A
ICV and CCV checks acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No N/A
ICB and CCB results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field blanks analyzed? (Levels C, D, E)	Yes No N/A
Field blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

SDG SL31919-1: Ni 0.205 mg/kg

SDG SL32124-1: Pb 0.177 mg/kg; Hg 0.0161 mg/kg

SDG SL32192-1: Sb 0.308 mg/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD

SDG SL32078-1: B 43%34%; Al 282%/265%; Mn 159%/190% Al parent sample result >4X spike conc.

SDG SL32124-1: B 27%/27%; Al 237%/313%; Mn 154%/224% Al parent sample result >4X spike conc.

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes No N/A
Duplicate results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/LCSD duplicates run due to insufficient sample material?	Yes No N/A
Field duplicate RPD values acceptable?	Yes No N/A
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No N/A
ICP serial dilution %D values acceptable?	Yes No N/A
ICP post digestion spike required?	Yes No N/A
ICP post digestion spike values acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Transcription/calculation errors?	Yes No N/A

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments (attach additional sheets as necessary):

CRDLs for As, Be, Cd, Cr, Pb, Zn and Hg were provided.

Appendix 4

Additional Documentation Requested By Client

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-31887-C-6-C MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor 1016	10	U	178	145		ug/Kg	☼	81	23 - 140
Aroclor 1260	11	U	178	158		ug/Kg	☼	89	20 - 131

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*82*		*23 - 146*

Lab Sample ID: 160-31887-C-6-D MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 403930 — **Prep Batch: 402292**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	178	147		ug/Kg	☼	83	23 - 140	2	30
Aroclor 1260	11	U	178	160		ug/Kg	☼	90	20 - 131	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*87*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-402141/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4	U	9.8	2.4	mg/Kg		11/21/18 12:35	12/05/18 14:33	1
Lithium	1.5	U	4.9	1.5	mg/Kg		11/21/18 12:35	12/05/18 14:33	1

Lab Sample ID: LCS 160-402141/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.43	8.73		mg/Kg		104	80 - 120

Lab Sample ID: LCSSRM 160-402141/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.44	D	mg/Kg		86.7	53.5 - 124.5

Lab Sample ID: 160-31919-1 MS — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	17.8	17.82		mg/Kg	☼	100	75 - 125

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 160-31919-1 MS — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.5	U	8.90	9.23		mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-31919-1 MSD — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 402141**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.4	U	17.8	17.29		mg/Kg	☼	97	75 - 125	3	30
Lithium	1.5	U	8.89	8.97		mg/Kg	☼	101	75 - 125	3	30

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-402140/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.18	U D	0.46	0.18	mg/Kg		11/21/18 12:27	12/11/18 21:34	2

Lab Sample ID: LCS 160-402140/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	49.0	45.36	D	mg/Kg		93	21 - 251

Lab Sample ID: 160-31919-1 MS — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.18	U D	45.8	42.22	D	mg/Kg	☼	92	75 - 125

Lab Sample ID: 160-31919-1 MSD — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405219 — **Prep Batch: 402140**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.18	U D	46.6	44.35	D	mg/Kg	☼	95	75 - 125	5	30

Lab Sample ID: MB 160-402143/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Arsenic	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Barium	0.49	U D	2.0	0.49	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		11/21/18 12:38	12/05/18 17:27	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-402143/1-A
Matrix: Solid
Analysis Batch: 404280

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402143

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.023	U D	0.049	0.023	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Cobalt	0.073	U D	0.20	0.073	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Copper	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Lead	0.12	U D	0.29	0.12	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Nickel	0.205	B D	0.49	0.20	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Silver	0.073	U D	0.20	0.073	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Strontium	0.23	U D	0.49	0.23	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Tin	0.088	U D	0.20	0.088	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		11/21/18 12:38	12/05/18 17:27	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		11/21/18 12:38	12/05/18 17:27	2

Lab Sample ID: LCS 160-402143/2-A
Matrix: Solid
Analysis Batch: 404280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.3	88.70	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-402143/3-A
Matrix: Solid
Analysis Batch: 404280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8439	D	mg/Kg		100.9	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	285.6	D	mg/Kg		109.8	75.0 - 125.0
Beryllium	97.6	110.2	D	mg/Kg		112.9	75.0 - 125.0
Cadmium	211	231.2	D	mg/Kg		109.6	74.9 - 125.1
Chromium	136	155.9	D	mg/Kg		114.6	70.0 - 130.1
Cobalt	48.2	55.52	D	mg/Kg		115.2	74.9 - 124.9
Copper	166	192.5	D	mg/Kg		115.9	74.7 - 124.7
Lead	111	123.8	D	mg/Kg		111.6	71.0 - 128.8
Manganese	288	252.7	D	mg/Kg		87.7	57.3 - 101.0
Molybdenum	110	124.8	D	mg/Kg		113.5	70.5 - 129.1
Nickel	91.9	107.1	D	mg/Kg		116.5	70.0 - 129.5

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-402143/3-A
Matrix: Solid
Analysis Batch: 404280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	191	216.2	D	mg/Kg		113.2	68.6 - 131.9
Silver	43.3	48.80	D	mg/Kg		112.7	69.5 - 130.5
Strontium	107	121.7	D	mg/Kg		113.7	72.1 - 128.0
Tin	99.9	111.9	D	mg/Kg		112.1	56.8 - 143.1
Vanadium	56.7	65.78	D	mg/Kg		116.0	56.8 - 143.4
Zinc	199	228.0	D	mg/Kg		114.6	69.8 - 130.2

Lab Sample ID: 160-31919-1 MS
Matrix: Soil
Analysis Batch: 404280

Client Sample ID: B3MMP5
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	84.9	D N	890	1220	D N	mg/Kg	☼	128	75 - 125
Arsenic	0.39	U D	89.0	88.22	D	mg/Kg	☼	99	75 - 125
Barium	0.49	U D	89.0	92.44	D	mg/Kg	☼	104	75 - 125
Beryllium	0.039	U D	8.90	9.26	D	mg/Kg	☼	104	75 - 125
Cadmium	0.024	U D	89.0	91.02	D	mg/Kg	☼	102	75 - 125
Chromium	0.44	U D	89.0	92.09	D	mg/Kg	☼	103	75 - 125
Cobalt	0.093	B D	89.0	90.48	D	mg/Kg	☼	102	75 - 125
Copper	0.39	U D	89.0	92.38	D	mg/Kg	☼	104	75 - 125
Lead	0.16	B D	89.0	92.91	D	mg/Kg	☼	104	75 - 125
Manganese	0.77	D	89.0	92.46	D	mg/Kg	☼	103	75 - 125
Molybdenum	0.20	U D	44.5	45.41	D	mg/Kg	☼	102	75 - 125
Nickel	0.20	U D	89.0	91.79	D	mg/Kg	☼	103	75 - 125
Selenium	0.31	U D	44.5	43.51	D	mg/Kg	☼	98	75 - 125
Silver	0.073	U D	17.8	18.71	D	mg/Kg	☼	105	75 - 125
Strontium	0.24	U D	89.0	89.16	D	mg/Kg	☼	100	75 - 125
Tin	0.088	U D	89.0	91.94	D	mg/Kg	☼	103	75 - 125
Uranium	0.077	B D	89.0	95.11	D	mg/Kg	☼	107	75 - 125
Vanadium	0.39	U D	89.0	91.14	D	mg/Kg	☼	102	75 - 125
Zinc	2.0	U D	89.0	86.97	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-31919-1 MSD
Matrix: Soil
Analysis Batch: 404280

Client Sample ID: B3MMP5
Prep Type: Total/NA
Prep Batch: 402143

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	84.9	D N	889	1182	D	mg/Kg	☼	123	75 - 125	3	30
Arsenic	0.39	U D	88.9	87.75	D	mg/Kg	☼	99	75 - 125	1	30
Barium	0.49	U D	88.9	94.43	D	mg/Kg	☼	106	75 - 125	2	30
Beryllium	0.039	U D	8.89	9.44	D	mg/Kg	☼	106	75 - 125	2	30
Cadmium	0.024	U D	88.9	92.47	D	mg/Kg	☼	104	75 - 125	2	30
Chromium	0.44	U D	88.9	89.81	D	mg/Kg	☼	101	75 - 125	3	30
Cobalt	0.093	B D	88.9	89.14	D	mg/Kg	☼	100	75 - 125	1	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-31919-1 MSD — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404280 — **Prep Batch: 402143**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Copper	0.39	U D	88.9	91.26	D	mg/Kg	☼	103	75 - 125	1	30
Lead	0.16	B D	88.9	93.65	D	mg/Kg	☼	105	75 - 125	1	30
Manganese	0.77	D	88.9	91.00	D	mg/Kg	☼	101	75 - 125	2	30
Molybdenum	0.20	U D	44.5	46.14	D	mg/Kg	☼	104	75 - 125	2	30
Nickel	0.20	U D	88.9	90.38	D	mg/Kg	☼	102	75 - 125	2	30
Selenium	0.31	U D	44.5	42.10	D	mg/Kg	☼	95	75 - 125	3	30
Silver	0.073	U D	17.8	18.83	D	mg/Kg	☼	106	75 - 125	1	30
Strontium	0.24	U D	88.9	91.23	D	mg/Kg	☼	103	75 - 125	2	30
Tin	0.088	U D	88.9	92.33	D	mg/Kg	☼	104	75 - 125	0	30
Uranium	0.077	B D	88.9	96.01	D	mg/Kg	☼	108	75 - 125	1	30
Vanadium	0.39	U D	88.9	89.42	D	mg/Kg	☼	101	75 - 125	2	30
Zinc	2.0	U D	88.9	86.63	D	mg/Kg	☼	97	75 - 125	0	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-402414/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402414**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.036	0.012	mg/Kg		11/26/18 09:25	11/26/18 17:11	1

Lab Sample ID: LCSSRM 160-402414/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402414**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.90	2.56	D	mg/Kg		88.1	50.7 - 149.3

Lab Sample ID: 160-31919-1 MS — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402414**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.011	U	0.915	0.829		mg/Kg	☼	91	80 - 120

Lab Sample ID: 160-31919-1 MSD — **Client Sample ID: B3MMP5**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 402731 — **Prep Batch: 402414**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.011	U	0.839	0.747		mg/Kg	☼	89	80 - 120	10	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405883 — **Prep Batch: 403415**

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	83		23 - 146

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-403833/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/03/18 09:24	12/04/18 20:04	1

Lab Sample ID: LCS 160-403833/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.59	8.82		mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-403833/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404140 — **Prep Batch: 403833**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	75.54	D	mg/Kg		82.5	53.5 - 124.5

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	19.4	19.32		mg/Kg	☼	100	75 - 125
Lithium	1.5	U	9.68	9.89		mg/Kg	☼	102	75 - 125

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404256 — **Prep Batch: 403833**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.4	U	18.9	18.61		mg/Kg	☼	99	75 - 125	4	30
Lithium	1.5	U	9.44	9.48		mg/Kg	☼	100	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-403830/1-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403830

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Arsenic	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Copper	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Lead	0.12	U D	0.29	0.12	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Tin	0.088	U D	0.20	0.088	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		12/03/18 09:21	12/11/18 02:21	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/03/18 09:21	12/11/18 02:21	2

Lab Sample ID: LCS 160-403830/2-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	85.9	89.76	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-403830/3-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9050	8674	D	mg/Kg		95.9	50.2 - 149.5
Arsenic	174	188.5	D	mg/Kg		108.2	70.2 - 129.8
Barium	281	283.7	D	mg/Kg		100.8	75.0 - 125.0
Beryllium	106	108.7	D	mg/Kg		102.9	75.0 - 125.0
Cadmium	228	223.5	D	mg/Kg		97.9	74.9 - 125.1
Chromium	147	156.7	D	mg/Kg		106.5	70.0 - 130.1
Cobalt	52.2	57.28	D	mg/Kg		109.8	74.9 - 124.9
Copper	180	198.7	D	mg/Kg		110.6	74.7 - 124.7
Lead	120	121.7	D	mg/Kg		101.3	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-403830/3-A
Matrix: Solid
Analysis Batch: 404957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	312	265.4	D	mg/Kg		85.1	57.3 - 101.0
Molybdenum	119	120.8	D	mg/Kg		101.4	70.5 - 129.1
Nickel	99.5	109.6	D	mg/Kg		110.2	70.0 - 129.5
Selenium	207	227.4	D	mg/Kg		110.0	68.6 - 131.9
Silver	46.9	48.29	D	mg/Kg		103.0	69.5 - 130.5
Strontium	116	115.4	D	mg/Kg		99.7	72.1 - 128.0
Tin	108	108.5	D	mg/Kg		100.3	56.8 - 143.1
Vanadium	61.4	66.28	D	mg/Kg		108.0	56.8 - 143.4
Zinc	215	227.1	D	mg/Kg		105.4	69.8 - 130.2

Lab Sample ID: 160-32018-2 MS
Matrix: Soil
Analysis Batch: 404957

Client Sample ID: B3MMP9
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	81.6	D	968	1220	D	mg/Kg	☼	118	75 - 125
Arsenic	0.39	U D	96.8	96.88	D	mg/Kg	☼	100	75 - 125
Barium	0.69	B D	96.8	111.1	D	mg/Kg	☼	114	75 - 125
Beryllium	0.039	U D	9.68	11.21	D	mg/Kg	☼	116	75 - 125
Cadmium	0.023	U D	96.8	108.4	D	mg/Kg	☼	112	75 - 125
Chromium	0.49	B D	96.8	101.4	D	mg/Kg	☼	104	75 - 125
Cobalt	0.073	U D	96.8	100.2	D	mg/Kg	☼	104	75 - 125
Copper	0.55	B D	96.8	103.3	D	mg/Kg	☼	106	75 - 125
Lead	0.21	B D	96.8	108.2	D	mg/Kg	☼	111	75 - 125
Manganese	1.9	D	96.8	99.86	D	mg/Kg	☼	101	75 - 125
Molybdenum	0.19	U D	48.4	53.89	D	mg/Kg	☼	111	75 - 125
Nickel	0.19	B D	96.8	99.70	D	mg/Kg	☼	103	75 - 125
Selenium	0.31	U D	48.4	45.51	D	mg/Kg	☼	94	75 - 125
Silver	0.073	U D	19.4	21.66	D	mg/Kg	☼	112	75 - 125
Strontium	0.24	B D	96.8	107.9	D	mg/Kg	☼	111	75 - 125
Tin	0.087	U D	96.8	109.0	D	mg/Kg	☼	113	75 - 125
Uranium	0.067	B D	96.8	110.9	D	mg/Kg	☼	115	75 - 125
Vanadium	0.39	U D	96.8	99.04	D	mg/Kg	☼	102	75 - 125
Zinc	1.9	U D	96.8	95.18	D	mg/Kg	☼	98	75 - 125

Lab Sample ID: 160-32018-2 MSD
Matrix: Soil
Analysis Batch: 404957

Client Sample ID: B3MMP9
Prep Type: Total/NA
Prep Batch: 403830

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	81.6	D	944	1237	D	mg/Kg	☼	122	75 - 125	1	30
Arsenic	0.39	U D	94.4	96.79	D	mg/Kg	☼	103	75 - 125	0	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404957 — **Prep Batch: 403830**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	0.69	B D	94.4	101.9	D	mg/Kg	☼	107	75 - 125	9	30
Beryllium	0.039	U D	9.44	10.0	D	mg/Kg	☼	106	75 - 125	11	30
Cadmium	0.023	U D	94.4	98.56	D	mg/Kg	☼	104	75 - 125	9	30
Chromium	0.49	B D	94.4	100.6	D	mg/Kg	☼	106	75 - 125	1	30
Cobalt	0.073	U D	94.4	100.1	D	mg/Kg	☼	106	75 - 125	0	30
Copper	0.55	B D	94.4	102.7	D	mg/Kg	☼	108	75 - 125	1	30
Lead	0.21	B D	94.4	98.40	D	mg/Kg	☼	104	75 - 125	9	30
Manganese	1.9	D	94.4	100.3	D	mg/Kg	☼	104	75 - 125	0	30
Molybdenum	0.19	U D	47.2	48.88	D	mg/Kg	☼	104	75 - 125	10	30
Nickel	0.19	B D	94.4	99.55	D	mg/Kg	☼	105	75 - 125	0	30
Selenium	0.31	U D	47.2	47.40	D	mg/Kg	☼	100	75 - 125	4	30
Silver	0.073	U D	18.9	19.80	D	mg/Kg	☼	105	75 - 125	9	30
Strontium	0.24	B D	94.4	97.49	D	mg/Kg	☼	103	75 - 125	10	30
Tin	0.087	U D	94.4	100.0	D	mg/Kg	☼	106	75 - 125	9	30
Uranium	0.067	B D	94.4	101.0	D	mg/Kg	☼	107	75 - 125	9	30
Vanadium	0.39	U D	94.4	101.1	D	mg/Kg	☼	107	75 - 125	2	30
Zinc	1.9	U D	94.4	96.42	D	mg/Kg	☼	102	75 - 125	1	30

Lab Sample ID: MB 160-403835/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.18	U D	0.46	0.18	mg/Kg		12/03/18 09:26	12/13/18 00:50	2

Lab Sample ID: LCS 160-403835/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	42.2	41.50	D	mg/Kg		98	21 - 251

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.19	U D	46.8	52.38	D	mg/Kg	☼	112	75 - 125

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405476 — **Prep Batch: 403835**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.19	U D	45.8	52.39	D	mg/Kg	☼	114	75 - 125	0	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32018-1
SDG: SL32018-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-404464/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.035	0.012	mg/Kg		12/06/18 12:55	12/07/18 12:38	1

Lab Sample ID: LCSSRM 160-404464/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.89	D	mg/Kg		94.7	59.7 - 139.1

Lab Sample ID: 160-32018-2 MS — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.012	U	0.932	1.01		mg/Kg	☼	109	80 - 120

Lab Sample ID: 160-32018-2 MSD — **Client Sample ID: B3MMP9**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404789 — **Prep Batch: 404464**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.012	U	0.945	1.03		mg/Kg	☼	109	80 - 120	1	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404263 — **Prep Batch: 403983**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	10	U	181	164		ug/Kg	☼	91	23 - 140	4	30
Aroclor 1260	11	U	181	146		ug/Kg	☼	81	20 - 131	8	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*77*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-404219/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.8	2.5	mg/Kg		12/05/18 12:07	12/11/18 14:29	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/05/18 12:07	12/11/18 14:29	1

Lab Sample ID: LCS 160-404219/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.84	9.88		mg/Kg		100	80 - 120

Lab Sample ID: LCSSRM 160-404219/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	79.48	D	mg/Kg		86.8	53.5 - 124.5

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	4.8	U D N	21.1	9.17	B D N	mg/Kg	☼	43	75 - 125
Lithium	5.5	B D	10.6	16.40	D	mg/Kg	☼	104	75 - 125

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405214 — **Prep Batch: 404219**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	4.8	U D N	20.6	7.07	B D N	mg/Kg	☼	34	75 - 125	26	30
Lithium	5.5	B D	10.3	16.62	D	mg/Kg	☼	108	75 - 125	1	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32078-1
SDG: SL32078-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-404211/1-A
Matrix: Solid
Analysis Batch: 406241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404211

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.17	U D	0.44	0.17	mg/Kg		12/05/18 11:08	12/17/18 16:16	2

Lab Sample ID: LCS 160-404211/2-A
Matrix: Solid
Analysis Batch: 406241

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404211

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	44.7	45.28	D	mg/Kg		101	21 - 251

Lab Sample ID: 160-32078-1 MS
Matrix: Soil
Analysis Batch: 406241

Client Sample ID: B3M454
Prep Type: Total/NA
Prep Batch: 404211

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.49	U D	51.8	50.04	D	mg/Kg	☼	97	75 - 125

Lab Sample ID: 160-32078-1 MSD
Matrix: Soil
Analysis Batch: 406241

Client Sample ID: B3M454
Prep Type: Total/NA
Prep Batch: 404211

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.49	U D	54.3	51.62	D	mg/Kg	☼	95	75 - 125	3	30

Lab Sample ID: MB 160-404218/1-A
Matrix: Solid
Analysis Batch: 405766

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404218

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/05/18 12:06	12/13/18 18:15	2

Lab Sample ID: MB 160-404218/1-A
Matrix: Solid
Analysis Batch: 406072

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404218

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.39	U D	0.98	0.39	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Beryllium	0.039	U D	0.098	0.039	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Chromium	0.44	U D	0.98	0.44	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Copper	0.39	U D	0.98	0.39	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Lead	0.12	U D	0.29	0.12	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Selenium	0.31	U D	0.49	0.31	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/05/18 12:06	12/15/18 04:25	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-404218/1-A
Matrix: Solid
Analysis Batch: 406072

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 404218

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	0.088	U D	0.20	0.088	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Uranium	0.039	U D	0.098	0.039	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Vanadium	0.39	U D	0.98	0.39	mg/Kg		12/05/18 12:06	12/15/18 04:25	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/05/18 12:06	12/15/18 04:25	2

Lab Sample ID: LCS 160-404218/2-A
Matrix: Solid
Analysis Batch: 406072

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404218

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	98.4	99.28	D	mg/Kg		101	80 - 120

Lab Sample ID: LCSSRM 160-404218/3-A
Matrix: Solid
Analysis Batch: 405766

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404218

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7512	D	mg/Kg		89.9	50.2 - 149.5

Lab Sample ID: LCSSRM 160-404218/3-A
Matrix: Solid
Analysis Batch: 406072

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 404218

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	161	179.2	D	mg/Kg		111.3	70.2 - 129.8
Barium	260	280.8	D	mg/Kg		108.0	75.0 - 125.0
Beryllium	97.6	106.9	D	mg/Kg		109.6	75.0 - 125.0
Cadmium	211	224.4	D	mg/Kg		106.4	74.9 - 125.1
Chromium	136	141.7	D	mg/Kg		104.2	70.0 - 130.1
Cobalt	48.2	55.42	D	mg/Kg		115.0	74.9 - 124.9
Copper	166	190.9	D	mg/Kg		115.0	74.7 - 124.7
Lead	111	118.7	D	mg/Kg		106.9	71.0 - 128.8
Manganese	288	272.9	D	mg/Kg		94.8	57.3 - 101.0
Molybdenum	110	116.4	D	mg/Kg		105.8	70.5 - 129.1
Nickel	91.9	105.2	D	mg/Kg		114.5	70.0 - 129.5
Selenium	191	220.3	D	mg/Kg		115.3	68.6 - 131.9
Silver	43.3	45.65	D	mg/Kg		105.4	69.5 - 130.5
Strontium	107	119.6	D	mg/Kg		111.8	72.1 - 128.0

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-404218/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406072 — **Prep Batch: 404218**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Tin	99.9	101.4	D	mg/Kg		101.5	56.8 - 143.1
Vanadium	56.7	56.64	D	mg/Kg		99.9	56.8 - 143.4
Zinc	199	228.6	D	mg/Kg		114.9	69.8 - 130.2

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405766 — **Prep Batch: 404218**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5500	D	1060	8479	X D	mg/Kg	☼	282	75 - 125

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406072 — **Prep Batch: 404218**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.1	D	106	103.9	D	mg/Kg	☼	96	75 - 125
Barium	72.0	D	106	170.7	D	mg/Kg	☼	93	75 - 125
Beryllium	0.27	D	10.6	11.29	D	mg/Kg	☼	104	75 - 125
Cadmium	0.11	D	106	100.8	D	mg/Kg	☼	95	75 - 125
Chromium	8.9	D	106	109.8	D	mg/Kg	☼	95	75 - 125
Cobalt	9.9	D	106	113.8	D	mg/Kg	☼	98	75 - 125
Copper	16.6	D	106	118.0	D	mg/Kg	☼	96	75 - 125
Lead	4.9	D	106	108.4	D	mg/Kg	☼	98	75 - 125
Manganese	351	D N	106	519.0	D N	mg/Kg	☼	159	75 - 125
Molybdenum	0.62	D	52.8	53.73	D	mg/Kg	☼	101	75 - 125
Nickel	14.1	D	106	126.2	D	mg/Kg	☼	106	75 - 125
Selenium	2.5	D	52.8	50.41	D	mg/Kg	☼	91	75 - 125
Silver	0.072	U D	21.1	20.24	D	mg/Kg	☼	96	75 - 125
Strontium	25.8	D	106	136.2	D	mg/Kg	☼	105	75 - 125
Tin	0.50	D	106	101.6	D	mg/Kg	☼	96	75 - 125
Uranium	0.44	D	106	106.8	D	mg/Kg	☼	101	75 - 125
Vanadium	65.8	D	106	161.0	D	mg/Kg	☼	90	75 - 125
Zinc	59.2	D	106	159.0	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405766 — **Prep Batch: 404218**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5500	D	1030	8229	X D	mg/Kg	☼	265	75 - 125	3	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406072 — **Prep Batch: 404218**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	2.1	D	103	102.4	D	mg/Kg	☼	97	75 - 125	2	30
Barium	72.0	D	103	181.5	D	mg/Kg	☼	106	75 - 125	6	30
Beryllium	0.27	D	10.3	11.30	D	mg/Kg	☼	107	75 - 125	0	30
Cadmium	0.11	D	103	101.6	D	mg/Kg	☼	98	75 - 125	1	30
Chromium	8.9	D	103	94.98	D	mg/Kg	☼	84	75 - 125	14	30
Cobalt	9.9	D	103	112.4	D	mg/Kg	☼	99	75 - 125	1	30
Copper	16.6	D	103	116.2	D	mg/Kg	☼	97	75 - 125	2	30
Lead	4.9	D	103	110.9	D	mg/Kg	☼	103	75 - 125	2	30
Manganese	351	D N	103	547.0	D N	mg/Kg	☼	190	75 - 125	5	30
Molybdenum	0.62	D	51.5	51.49	D	mg/Kg	☼	99	75 - 125	4	30
Nickel	14.1	D	103	112.1	D	mg/Kg	☼	95	75 - 125	12	30
Selenium	2.5	D	51.5	51.14	D	mg/Kg	☼	94	75 - 125	1	30
Silver	0.072	U D	20.6	20.32	D	mg/Kg	☼	99	75 - 125	0	30
Strontium	25.8	D	103	137.8	D	mg/Kg	☼	109	75 - 125	1	30
Tin	0.50	D	103	102.4	D	mg/Kg	☼	99	75 - 125	1	30
Uranium	0.44	D	103	106.8	D	mg/Kg	☼	103	75 - 125	0	30
Vanadium	65.8	D	103	161.2	D	mg/Kg	☼	93	75 - 125	0	30
Zinc	59.2	D	103	158.3	D	mg/Kg	☼	96	75 - 125	0	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-405484/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.013	U	0.039	0.013	mg/Kg		12/13/18 08:50	12/13/18 13:48	1

Lab Sample ID: LCSSRM 160-405484/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.91	D	mg/Kg		94.9	59.7 - 139.1

Lab Sample ID: 160-32078-1 MS — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.013	U	0.982	1.02		mg/Kg	☼	104	80 - 120

Lab Sample ID: 160-32078-1 MSD — **Client Sample ID: B3M454**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 405538 — **Prep Batch: 405484**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.013	U	1.00	1.04		mg/Kg	☼	103	80 - 120	1	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 404929 — **Prep Batch: 404502**

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*73*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406144/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5	U	9.9	2.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1
Lithium	1.5	U	4.9	1.5	mg/Kg		12/17/18 10:56	12/19/18 15:49	1

Lab Sample ID: LCS 160-406144/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	9.16	8.79		mg/Kg		96	80 - 120

Lab Sample ID: LCSSRM 160-406144/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.60	D	mg/Kg		83.6	53.5 - 124.5

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	5.2	U D N	18.7	5.09	B D N	mg/Kg	☼	27	75 - 125
Lithium	5.6	B D	9.35	15.52	D	mg/Kg	☼	106	75 - 125

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406803 — **Prep Batch: 406144**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	5.2	U D N	19.5	5.28	B D N	mg/Kg	☼	27	75 - 125	4	30
Lithium	5.6	B D	9.73	16.16	D	mg/Kg	☼	109	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32124-1
SDG: SL32124-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406142/1-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406142

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Arsenic	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Barium	0.49	U D	2.0	0.49	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Beryllium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cadmium	0.024	U D	0.049	0.024	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Chromium	0.44	U D	0.99	0.44	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Cobalt	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Copper	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Lead	0.177	B D	0.30	0.12	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Manganese	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Molybdenum	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Nickel	0.20	U D	0.49	0.20	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Selenium	0.32	U D	0.49	0.32	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Silver	0.074	U D	0.20	0.074	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Strontium	0.24	U D	0.49	0.24	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Tin	0.089	U D	0.20	0.089	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Uranium	0.039	U D	0.099	0.039	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Vanadium	0.39	U D	0.99	0.39	mg/Kg		12/17/18 10:53	12/20/18 18:40	2
Zinc	2.0	U D	4.9	2.0	mg/Kg		12/17/18 10:53	12/20/18 18:40	2

Lab Sample ID: LCS 160-406142/2-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	91.6	94.61	D	mg/Kg		103	80 - 120

Lab Sample ID: LCSSRM 160-406142/3-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	8457	D	mg/Kg		101.2	50.2 - 149.5
Arsenic	161	184.6	D	mg/Kg		114.7	70.2 - 129.8
Barium	260	288.0	D	mg/Kg		110.8	75.0 - 125.0
Beryllium	97.6	115.1	D	mg/Kg		117.9	75.0 - 125.0
Cadmium	211	230.7	D	mg/Kg		109.3	74.9 - 125.1
Chromium	136	155.1	D	mg/Kg		114.1	70.0 - 130.1
Cobalt	48.2	57.12	D	mg/Kg		118.5	74.9 - 124.9
Copper	166	190.9	D	mg/Kg		115.0	74.7 - 124.7
Lead	111	127.8	D	mg/Kg		115.1	71.0 - 128.8

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406142/3-A
Matrix: Solid
Analysis Batch: 406946

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	288	253.6	D	mg/Kg		88.1	57.3 - 101.0
Molybdenum	110	130.1	D	mg/Kg		118.3	70.5 - 129.1
Nickel	91.9	107.6	D	mg/Kg		117.1	70.0 - 129.5
Selenium	191	224.5	D	mg/Kg		117.5	68.6 - 131.9
Silver	43.3	48.89	D	mg/Kg		112.9	69.5 - 130.5
Strontium	107	126.0	D	mg/Kg		117.7	72.1 - 128.0
Tin	99.9	117.7	D	mg/Kg		117.9	56.8 - 143.1
Vanadium	56.7	68.94	D	mg/Kg		121.6	56.8 - 143.4
Zinc	199	227.9	D	mg/Kg		114.5	69.8 - 130.2

Lab Sample ID: 160-32124-8 MS
Matrix: Soil
Analysis Batch: 406946

Client Sample ID: B3M442
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5800	D	935	8020	D X	mg/Kg	☼	237	75 - 125
Arsenic	2.4	D	93.5	89.78	D	mg/Kg	☼	93	75 - 125
Barium	66.7	D	93.5	172.6	D	mg/Kg	☼	113	75 - 125
Beryllium	0.30	D	9.35	10.60	D	mg/Kg	☼	110	75 - 125
Cadmium	0.084	D	93.5	90.77	D	mg/Kg	☼	97	75 - 125
Chromium	8.7	D	93.5	88.80	D	mg/Kg	☼	86	75 - 125
Cobalt	9.8	D	93.5	100.6	D	mg/Kg	☼	97	75 - 125
Copper	14.0	D	93.5	100.9	D	mg/Kg	☼	93	75 - 125
Lead	4.8	D	93.5	97.12	D	mg/Kg	☼	99	75 - 125
Manganese	334	D N	93.5	478.3	D N	mg/Kg	☼	154	75 - 125
Molybdenum	0.39	B D	46.8	48.17	D	mg/Kg	☼	102	75 - 125
Nickel	12.0	D	93.5	102.0	D	mg/Kg	☼	96	75 - 125
Selenium	2.4	D	46.8	44.10	D	mg/Kg	☼	89	75 - 125
Silver	0.077	U D	18.7	18.17	D	mg/Kg	☼	97	75 - 125
Strontium	20.7	D	93.5	124.8	D	mg/Kg	☼	111	75 - 125
Tin	0.45	D	93.5	92.31	D	mg/Kg	☼	98	75 - 125
Uranium	0.44	D	93.5	95.38	D	mg/Kg	☼	102	75 - 125
Vanadium	66.4	D	93.5	156.4	D	mg/Kg	☼	96	75 - 125
Zinc	48.6	D	93.5	135.3	D	mg/Kg	☼	93	75 - 125

Lab Sample ID: 160-32124-8 MSD
Matrix: Soil
Analysis Batch: 406946

Client Sample ID: B3M442
Prep Type: Total/NA
Prep Batch: 406142

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5800	D	973	8844	D X	mg/Kg	☼	313	75 - 125	10	30
Arsenic	2.4	D	97.3	100.0	D	mg/Kg	☼	100	75 - 125	11	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406946 — **Prep Batch: 406142**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	66.7	D	97.3	182.9	D	mg/Kg	☼	119	75 - 125	6	30
Beryllium	0.30	D	9.73	10.92	D	mg/Kg	☼	109	75 - 125	3	30
Cadmium	0.084	D	97.3	93.39	D	mg/Kg	☼	96	75 - 125	3	30
Chromium	8.7	D	97.3	96.97	D	mg/Kg	☼	91	75 - 125	9	30
Cobalt	9.8	D	97.3	112.0	D	mg/Kg	☼	105	75 - 125	11	30
Copper	14.0	D	97.3	111.5	D	mg/Kg	☼	100	75 - 125	10	30
Lead	4.8	D	97.3	102.0	D	mg/Kg	☼	100	75 - 125	5	30
Manganese	334	D N	97.3	552.5	D N	mg/Kg	☼	224	75 - 125	14	30
Molybdenum	0.39	B D	48.7	50.05	D	mg/Kg	☼	102	75 - 125	4	30
Nickel	12.0	D	97.3	111.7	D	mg/Kg	☼	102	75 - 125	9	30
Selenium	2.4	D	48.7	48.15	D	mg/Kg	☼	94	75 - 125	9	30
Silver	0.077	U D	19.5	18.68	D	mg/Kg	☼	96	75 - 125	3	30
Strontium	20.7	D	97.3	131.5	D	mg/Kg	☼	114	75 - 125	5	30
Tin	0.45	D	97.3	96.02	D	mg/Kg	☼	98	75 - 125	4	30
Uranium	0.44	D	97.3	99.51	D	mg/Kg	☼	102	75 - 125	4	30
Vanadium	66.4	D	97.3	168.8	D	mg/Kg	☼	105	75 - 125	8	30
Zinc	48.6	D	97.3	149.4	D	mg/Kg	☼	104	75 - 125	10	30

Lab Sample ID: MB 160-406145/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.17	U D	0.42	0.17	mg/Kg		12/17/18 10:59	12/26/18 14:30	2

Lab Sample ID: LCS 160-406145/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	45.5	45.53	D	mg/Kg		100	21 - 251

Lab Sample ID: 160-32124-8 MS — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.51	U D	51.6	49.98	D	mg/Kg	☼	97	75 - 125

Lab Sample ID: 160-32124-8 MSD — **Client Sample ID: B3M442**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407598 — **Prep Batch: 406145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.51	U D	51.2	48.18	D	mg/Kg	☼	94	75 - 125	4	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32124-1
SDG: SL32124-1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406420/1-A
Matrix: Solid
Analysis Batch: 406517

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406420

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0161	B	0.035	0.012	mg/Kg		12/18/18 12:51	12/18/18 17:33	1

Lab Sample ID: LCSSRM 160-406420/2-A ^10
Matrix: Solid
Analysis Batch: 406517

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406420

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			11.5	11.61	D	mg/Kg		101.0	59.7 - 139.1		

Lab Sample ID: 160-32124-8 MS
Matrix: Soil
Analysis Batch: 406517

Client Sample ID: B3M442
Prep Type: Total/NA
Prep Batch: 406420

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	0.021	B C	1.00	1.09		mg/Kg	☼	107	80 - 120		

Lab Sample ID: 160-32124-8 MSD
Matrix: Soil
Analysis Batch: 406517

Client Sample ID: B3M442
Prep Type: Total/NA
Prep Batch: 406420

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.021	B C	0.991	1.05		mg/Kg	☼	103	80 - 120	4	30

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 406765 — **Prep Batch: 405132**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor 1016	9.5	U	166	139		ug/Kg	☼	83	23 - 140	3	30
Aroclor 1260	9.8	U	166	159		ug/Kg	☼	96	20 - 131	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*89*		*23 - 146*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 160-406598/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.2	U	8.7	2.2	mg/Kg		12/19/18 10:26	12/27/18 19:22	1
Lithium	1.3	U	4.3	1.3	mg/Kg		12/19/18 10:26	12/27/18 19:22	1

Lab Sample ID: LCS 160-406598/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	8.46	9.34		mg/Kg		110	80 - 120

Lab Sample ID: LCSSRM 160-406598/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	91.6	76.82	D	mg/Kg		83.9	53.5 - 124.5

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	2.4	U	19.2	18.39		mg/Kg	☼	96	75 - 125
Lithium	1.4	U	9.61	10.50		mg/Kg	☼	109	75 - 125

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407765 — **Prep Batch: 406598**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.4	U	19.8	20.09		mg/Kg	☼	101	75 - 125	9	30
Lithium	1.4	U	9.92	11.06		mg/Kg	☼	112	75 - 125	5	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 160-32192-1
SDG: SL32192-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 160-406543/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.308	B D	0.48	0.19	mg/Kg		12/19/18 10:18	01/03/19 16:26	2

Lab Sample ID: LCS 160-406543/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	43.4	41.72	D	mg/Kg		96	21 - 251

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.20	U D	44.0	41.85	D	mg/Kg	☼	95	75 - 125

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408938 — **Prep Batch: 406543**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.20	U D	46.4	43.83	D	mg/Kg	☼	94	75 - 125	5	30

Lab Sample ID: MB 160-406597/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.7	U D	4.3	1.7	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Arsenic	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Barium	0.43	U D	1.7	0.43	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Beryllium	0.035	U D	0.087	0.035	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Cadmium	0.021	U D	0.043	0.021	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Chromium	0.39	U D	0.87	0.39	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Cobalt	0.065	U D	0.17	0.065	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Copper	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Lead	0.11	U D	0.26	0.11	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Manganese	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Molybdenum	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Nickel	0.17	U D	0.43	0.17	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Silver	0.065	U D	0.17	0.065	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Strontium	0.21	U D	0.43	0.21	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Tin	0.078	U D	0.17	0.078	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Uranium	0.035	U D	0.087	0.035	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Vanadium	0.35	U D	0.87	0.35	mg/Kg		12/19/18 10:25	12/28/18 22:02	2
Zinc	1.7	U D	4.3	1.7	mg/Kg		12/19/18 10:25	12/28/18 22:02	2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-406597/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	0.28	U D	0.43	0.28	mg/Kg		12/19/18 10:25	12/31/18 19:53	2

Lab Sample ID: LCS 160-406597/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	84.6	88.89	D	mg/Kg		105	80 - 120

Lab Sample ID: LCSSRM 160-406597/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8360	7699	D	mg/Kg		92.1	50.2 - 149.5
Arsenic	161	192.1	D	mg/Kg		119.3	70.2 - 129.8
Barium	260	282.0	D	mg/Kg		108.5	75.0 - 125.0
Beryllium	97.6	104.8	D	mg/Kg		107.4	75.0 - 125.0
Cadmium	211	227.0	D	mg/Kg		107.6	74.9 - 125.1
Chromium	136	153.9	D	mg/Kg		113.2	70.0 - 130.1
Cobalt	48.2	56.69	D	mg/Kg		117.6	74.9 - 124.9
Copper	166	194.3	D	mg/Kg		117.0	74.7 - 124.7
Lead	111	128.3	D	mg/Kg		115.6	71.0 - 128.8
Manganese	288	255.6	D	mg/Kg		88.7	57.3 - 101.0
Molybdenum	110	126.6	D	mg/Kg		115.1	70.5 - 129.1
Nickel	91.9	108.5	D	mg/Kg		118.0	70.0 - 129.5
Silver	43.3	49.91	D	mg/Kg		115.3	69.5 - 130.5
Strontium	107	118.0	D	mg/Kg		110.3	72.1 - 128.0
Tin	99.9	116.7	D	mg/Kg		116.8	56.8 - 143.1
Vanadium	56.7	64.31	D	mg/Kg		113.4	56.8 - 143.4
Zinc	199	232.1	D	mg/Kg		116.6	69.8 - 130.2

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSSRM 160-406597/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	191	214.9	D	mg/Kg		112.5	68.6 - 131.9

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	87.9	D	961	1212	D	mg/Kg	☼	117	75 - 125
Arsenic	0.38	U D	96.1	96.60	D	mg/Kg	☼	100	75 - 125
Barium	0.64	B D	96.1	97.41	D	mg/Kg	☼	101	75 - 125
Beryllium	0.038	U D	9.61	9.42	D	mg/Kg	☼	98	75 - 125
Cadmium	0.023	U D	96.1	95.20	D	mg/Kg	☼	99	75 - 125
Chromium	0.52	B D	96.1	96.31	D	mg/Kg	☼	100	75 - 125
Cobalt	0.090	B D	96.1	96.80	D	mg/Kg	☼	101	75 - 125
Copper	0.38	B D	96.1	96.56	D	mg/Kg	☼	100	75 - 125
Lead	0.17	B D	96.1	98.18	D	mg/Kg	☼	102	75 - 125
Manganese	3.9	D	96.1	99.24	D	mg/Kg	☼	99	75 - 125
Molybdenum	0.19	U D	48.1	49.96	D	mg/Kg	☼	104	75 - 125
Nickel	0.19	U D	96.1	97.62	D	mg/Kg	☼	102	75 - 125
Silver	0.071	U D	19.2	19.14	D	mg/Kg	☼	100	75 - 125
Strontium	0.23	B D	96.1	99.03	D	mg/Kg	☼	103	75 - 125
Tin	0.085	U D	96.1	95.45	D	mg/Kg	☼	99	75 - 125
Uranium	0.083	B D	96.1	99.10	D	mg/Kg	☼	103	75 - 125
Vanadium	0.38	U D	96.1	95.66	D	mg/Kg	☼	100	75 - 125
Zinc	1.9	U D	96.1	95.22	D	mg/Kg	☼	99	75 - 125

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	0.30	U D	48.1	45.50	D	mg/Kg	☼	95	75 - 125

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	87.9	D	992	1224	D	mg/Kg	☼	114	75 - 125	1	30
Arsenic	0.38	U D	99.2	99.21	D	mg/Kg	☼	100	75 - 125	3	30
Barium	0.64	B D	99.2	100.4	D	mg/Kg	☼	101	75 - 125	3	30
Beryllium	0.038	U D	9.92	9.66	D	mg/Kg	☼	97	75 - 125	3	30
Cadmium	0.023	U D	99.2	99.69	D	mg/Kg	☼	100	75 - 125	5	30
Chromium	0.52	B D	99.2	98.63	D	mg/Kg	☼	99	75 - 125	2	30
Cobalt	0.090	B D	99.2	99.00	D	mg/Kg	☼	100	75 - 125	2	30
Copper	0.38	B D	99.2	99.01	D	mg/Kg	☼	99	75 - 125	3	30
Lead	0.17	B D	99.2	101.6	D	mg/Kg	☼	102	75 - 125	3	30
Manganese	3.9	D	99.2	102.1	D	mg/Kg	☼	99	75 - 125	3	30

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408312 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Molybdenum	0.19	U D	49.6	52.07	D	mg/Kg	☼	105	75 - 125	4	30
Nickel	0.19	U D	99.2	99.96	D	mg/Kg	☼	101	75 - 125	2	30
Silver	0.071	U D	19.8	19.97	D	mg/Kg	☼	101	75 - 125	4	30
Strontium	0.23	B D	99.2	103.4	D	mg/Kg	☼	104	75 - 125	4	30
Tin	0.085	U D	99.2	100.4	D	mg/Kg	☼	101	75 - 125	5	30
Uranium	0.083	B D	99.2	104.4	D	mg/Kg	☼	105	75 - 125	5	30
Vanadium	0.38	U D	99.2	98.57	D	mg/Kg	☼	99	75 - 125	3	30
Zinc	1.9	U D	99.2	97.86	D	mg/Kg	☼	99	75 - 125	3	30

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 408460 — **Prep Batch: 406597**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	0.30	U D	49.6	43.59	D	mg/Kg	☼	88	75 - 125	4	30

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-406817/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.037	0.012	mg/Kg		12/20/18 09:19	12/21/18 09:54	1

Lab Sample ID: LCSSRM 160-406817/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	11.5	10.64	D	mg/Kg		92.5	59.7 - 139.1

Lab Sample ID: 160-32192-1 MS — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.019	B	0.939	0.961		mg/Kg	☼	100	80 - 120

Lab Sample ID: 160-32192-1 MSD — **Client Sample ID: B3MMR3**
Matrix: Soil — **Prep Type: Total/NA**
Analysis Batch: 407085 — **Prep Batch: 406817**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.019	B	0.964	1.01		mg/Kg	☼	102	80 - 120	5	30

Date: 16 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Radiochemical - Sample Data Groups (SDGs) RL8733-1, RL8809-1, RL8854-1, RL8902-1, RL8933-1

INTRODUCTION

This memorandum presents the results of data validation for SDGs RL8733-1, RL8809-1, RL8854-1, RL8902-1 and RL8933-1 prepared by TestAmerica Inc. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3MMP7	11/15/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3MMR1	11/26/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M420	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M436	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M460	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M472	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M440	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M452	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M468	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M464	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M456	11/29/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M428	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M448	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M444	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M416	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M432	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3M424	12/03/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241
B3MMR5	12/06/18	Soil	C	Co-60, Iso-Pu, Iso-U, Pu-241

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analyses are not required for the methods performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

For SDG RL8733-1, the Pu-242 tracer recovery for the MB was above the upper acceptance limit. Since the sample was a QC sample, data should not be qualified as a result.

For SDG RL8854-1, the Pu-242 tracer recovery for sample B3M420Dup was above the upper acceptance limit. The tracer recovery for the parent sample was within the acceptance limit, therefore, data should not be qualified as a result.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable with the following exceptions.

For SDG RL8854-1, the RPD for U-233/234 was above the acceptance limit. The U-233/234 results for both samples were <5X the MDC and the difference between the samples was ≤ 2X the MDC of the primary sample; therefore data should not be qualified.

For SDG RL8902-1, the RPD for U-233/234 was above the acceptance limit. The U-233/234 results for both samples were <5X the MDC and the difference between the samples was ≤2X the MDC of the primary sample; therefore data should not be qualified.

For SDG RL8933-1, the RPD for Pu-241 was above the acceptance limit. The Pu-241 results for both samples were <5X the MDC and the difference between the samples was ≤2X the MDC of the primary sample; therefore data should not be qualified.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs were not provided.

- **Completeness**

SDGs RL8733-1, RL8809-1, RL8854-1, RL8902-1 and RL8933-1 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan*, February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan*, February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: RL8733-1, RL8809-1, RL8854-1, RL8902-1, RL8933-1	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E

Project: RTL	Data Package: VSR19-016
Validator: Eyda Hergenreder	Lab: TestAmerica / Date: 01/16/19
	SDG: RL8733-1, RL8809-1, RL8854-1, RL8902-1, RL8933-1

Analyses Performed					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	☐ Gamma Spectroscopy	☐ Tritium
☐ Total Uranium	☐ Radium-22	X Co-60	X Pu-241		

Samples/Matrix Soil

SDG RL8733-1: B3MMP7 SDG RL8809-1: B3MMR1 SDG RL8933-1: B3MMR5

SDG RL8854-1: B3M420, B3M436, B3M460, B3M472, B3M440, B3M452, B3M468, B3M464, B3M456

SDG RL8902-1: B3M428, B3M448, B3M444, B3M416, B3M432, B3M424,

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	(Yes) No N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	Yes No N/A
Method blank results acceptable?	Yes No N/A
Analytes detected in method blank?	Yes No N/A
Field blank(s) analyzed?	Yes No N/A
Field blank results acceptable?	Yes No N/A
Analytes detected in field blank(s)?	Yes No N/A
Transcription/Calculation Errors? (Levels D, E)	Yes No N/A

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	Yes No N/A
LCS/BSS recoveries acceptable?	Yes No N/A
LCS/BSS traceable? (Levels D,E)	Yes No N/A
LCS/BSS expired? (Levels D,E)	Yes No N/A
LCS/BSS levels correct? (Levels D,E)	Yes No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☒ N/A
Chemical carrier added?	Yes No (N/A)
Chemical recovery acceptable?	Yes No (N/A)
Chemical carrier traceable? (Levels D, E)	Yes No (N/A)
Chemical carrier expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	(Yes) No N/A
Tracer recovery acceptable?	Yes (No) N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG RL8733-1: Pu-242 MB 114%

SDG RL8854-1: Pu-242 B3M420Dup 113%

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☒ N/A
Matrix spike analyzed?	Yes No (N/A)
Spike recoveries acceptable?	Yes No (N/A)
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG RL8854-1; U-232/234 39% (results for both parents were <5X MDC)

SDG RL8902-1: U-233/234 40% (results for both parents were <5X MDC)

SDG RL8933-1: Pu-241 107%; sample 5.46/dup <MDC (results for both parents were <5X MDC)

All other RPD >30% results were <MDCs

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☒ N/A
Field duplicate sample(s) analyzed?	Yes No (N/A)
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split sample(s) analyzed?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	(Yes) No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	(Yes) No N/A
Results supported in raw data?(Levels D, E)	Yes No (N/A)
Results acceptable? (Levels D, E)	Yes No (N/A)
MDC's meet required reporting limits?	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

CRDLs were not provided.

Appendix 4

Additional Documentation Requested By Client

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8733-1	B3MMP7	91.3
300-8733-1 DU	B3MMP7	93.8
LCS 300-16036/2-A	Lab Control Sample	99.9
MB 300-16036/1-A	Method Blank	114 X

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8733-1	B3MMP7	51.0
300-8733-1 DU	B3MMP7	60.6
LCS 300-16048/2-A	Lab Control Sample	69.5
MB 300-16048/1-A	Method Blank	53.2

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8733-1	B3MMP7	91.3
300-8733-1 DU	B3MMP7	93.8
LCS 300-16040/2-A	Lab Control Sample	99.9
MB 300-16040/1-A	Method Blank	114

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-15972/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0128	U		0.0612	0.370	0.0442	pCi/g	11/20/18 14:05	11/20/18 16:04	1

Lab Sample ID: LCS 300-15972/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.65	2.398		0.186	0.370	0.0847	pCi/g	90	80 - 120

Lab Sample ID: 300-8733-1 DU — **Client Sample ID: B3MMP7**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16014 — **Prep Batch: 15972**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.018	U	-0.0230	U	0.0839	0.370	0.0657	pCi/g	23	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16048/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16296 — **Prep Batch: 16048**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00982	U	0.0450	0.0450	1.00	0.117	pCi/g	11/23/18 10:28	12/03/18 11:47	1
U-233/234	-0.00357	U	0.0447	0.0447	1.00	0.0968	pCi/g	11/23/18 10:28	12/03/18 11:47	1
U-235/236	-0.00179	U	0.0447	0.0447	1.00	0.0880	pCi/g	11/23/18 10:28	12/03/18 11:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*53.2*		*30 - 105*	*11/23/18 10:28*	*12/03/18 11:47*	*1*

Lab Sample ID: LCS 300-16048/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16296 — **Prep Batch: 16048**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	1.81	1.675		0.440	1.00	0.0787	pCi/g	92	80 - 120
U-233/234	1.73	2.110	o	0.518	1.00	0.0835	pCi/g	122	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*69.5*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16296

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16048

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0113	U		-0.00622	U y	0.0391	1.00	0.0951	pCi/g			685	30
U-233/234	0.0284	U o		-0.00544	U o y	0.0390	1.00	0.0927	pCi/g			295	30
U-235/236	-0.0076	U		-0.000777	U y	0.0388	1.00	0.0712	pCi/g			163	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*60.6*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16036/1-A
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16036

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00230	U	0.0288	0.0288	1.00	0.0714	pCi/g	11/23/18 09:47	12/04/18 17:22	1
Pu-239/240	-0.00345	U	0.0289	0.0289	1.00	0.0763	pCi/g	11/23/18 09:47	12/04/18 17:22	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*114*	*X*	*30 - 105*	*11/23/18 09:47*	*12/04/18 17:22*	*1*

Lab Sample ID: LCS 300-16036/2-A
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16036

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			0.902	0.856		0.276	1.00	0.0812	pCi/g	95	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*99.9*		*30 - 105*

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16398

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16036

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.00846	U		-0.00460	U y	0.0289	1.00	0.0704	pCi/g			677	30
Pu-239/240	-0.00060	U		-0.000575	U	0.0288	1.00	0.0528	pCi/g			5	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*93.8*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8733-1
SDG: RL8733-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16040/1-A
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16040

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	-0.189	U	0.0453	1.22	15.0	2.06	pCi/g	11/23/18 09:54	12/12/18 04:51	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*114*			*11/23/18 09:54*	*12/12/18 04:51*	*1*

Lab Sample ID: LCS 300-16040/2-A
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16040

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			223	228.6		14.5	15.0	2.06	pCi/g	103	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*99.9*		

Lab Sample ID: 300-8733-1 DU
Matrix: Solid
Analysis Batch: 16729

Client Sample ID: B3MMP7
Prep Type: Total/NA
Prep Batch: 16040

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.61	U		-0.164	U y	1.24	15.0	2.10	pCi/g			115	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*93.8*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8809-1	B3MMR1	96.1
300-8809-1 DU	B3MMR1	92.2
LCS 300-16368/2-A	Lab Control Sample	94.9
MB 300-16368/1-A	Method Blank	83.2

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8809-1	B3MMR1	74.3
300-8809-1 DU	B3MMR1	86.1
LCS 300-16370/2-A	Lab Control Sample	85.3
MB 300-16370/1-A	Method Blank	86.0

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8809-1	B3MMR1	96.1
300-8809-1 DU	B3MMR1	92.2
LCS 300-16369/2-A	Lab Control Sample	94.9
MB 300-16369/1-A	Method Blank	83.2

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16361/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0220	U		0.0451	0.370	0.0608	pCi/g	12/05/18 10:54	12/21/18 10:45	1

Lab Sample ID: LCS 300-16361/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.563		0.195	0.370	0.0804	pCi/g	98	80 - 120		

Lab Sample ID: 300-8809-1 DU — **Client Sample ID: B3MMR1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16945 — **Prep Batch: 16361**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.016	U		-0.0399	U y	0.0887	0.370	0.0691	pCi/g			84	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16370/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16662 — **Prep Batch: 16370**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00386	U	0.0277	0.0277	1.00	0.0658	pCi/g	12/05/18 12:50	12/12/18 16:24	1
U-233/234	-0.00441	U	0.0277	0.0277	1.00	0.0675	pCi/g	12/05/18 12:50	12/12/18 16:24	1
U-235/236	-0.000552	U	0.0276	0.0276	1.00	0.0506	pCi/g	12/05/18 12:50	12/12/18 16:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*86.0*		*30 - 105*	*12/05/18 12:50*	*12/12/18 16:24*	*1*

Lab Sample ID: LCS 300-16370/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16662 — **Prep Batch: 16370**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.51	3.220		0.663	1.00	0.0744	pCi/g	92	80 - 120		
U-233/234			3.36	2.874		0.607	1.00	0.0675	pCi/g	86	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*85.3*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 16662

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16370

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0404	U		-0.00266	U y	0.0266	1.00	0.0597	pCi/g			228	30
U-233/234	0.0195	U		0.0504	U y	0.0537	1.00	0.0597	pCi/g			88	30
U-235/236	0.0153	U		-0.00053 1	U y	0.0266	1.00	0.0487	pCi/g			214	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*86.1*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16368/1-A
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16368

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	0.00642	U	0.0295	0.0295	1.00	0.0804	pCi/g	12/05/18 12:28	12/12/18 16:32	1
Pu-239/240	-0.00233	U	0.0293	0.0293	1.00	0.0634	pCi/g	12/05/18 12:28	12/12/18 16:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*83.2*		*30 - 105*	*12/05/18 12:28*	*12/12/18 16:32*	*1*

Lab Sample ID: LCS 300-16368/2-A
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16368

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.07	4.306		0.821	1.00	0.0479	pCi/g	106	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*94.9*		*30 - 105*

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 16661

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16368

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	0.0400	U		0.0367	U	0.0526	1.00	0.0829	pCi/g			9	30
Pu-239/240	0.000	U		-0.00060 1	U y	0.0301	1.00	0.0552	pCi/g			200	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*92.2*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8809-1
SDG: RL8809-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16369/1-A
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16369

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.696	U	0.192	1.59	15.0	2.98	pCi/g	12/05/18 12:46	12/28/18 18:46	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*83.2*			*12/05/18 12:46*	*12/28/18 18:46*	*1*

Lab Sample ID: LCS 300-16369/2-A
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16369

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			194	228.9		14.8	15.0	2.52	pCi/g	118	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*94.9*		

Lab Sample ID: 300-8809-1 DU
Matrix: Solid
Analysis Batch: 17051

Client Sample ID: B3MMR1
Prep Type: Total/NA
Prep Batch: 16369

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	0.819	U		0.644	U	1.55	15.0	3.01	pCi/g			24	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*92.2*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8854-1	B3M420	96.6
300-8854-1 DU	B3M420	113 X
300-8854-2	B3M436	97.4
300-8854-3	B3M460	90.4
300-8854-4	B3M472	96.0
300-8854-5	B3M440	83.7
300-8854-6	B3M452	97.0
300-8854-7	B3M468	94.1
300-8854-8	B3M464	91.2
300-8854-9	B3M456	95.4
LCS 300-16458/2-A	Lab Control Sample	93.9
MB 300-16458/1-A	Method Blank	91.1

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8854-1	B3M420	81.5
300-8854-1 DU	B3M420	83.3
300-8854-2	B3M436	83.3
300-8854-3	B3M460	75.9
300-8854-4	B3M472	90.8
300-8854-5	B3M440	86.4
300-8854-6	B3M452	80.0
300-8854-7	B3M468	67.7
300-8854-8	B3M464	97.6
300-8854-9	B3M456	83.2
LCS 300-16459/2-A	Lab Control Sample	90.1
MB 300-16459/1-A	Method Blank	90.2

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8854-1	B3M420	96.6
300-8854-1 DU	B3M420	113
300-8854-2	B3M436	97.4
300-8854-3	B3M460	90.4
300-8854-4	B3M472	96.0
300-8854-5	B3M440	83.7

Percent Yield (Acceptance Limits)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8854-1
SDG: RL8854-1

Method: ST-RC-0245 - Plutonium-241 (LSC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Pu-242 (T)							
Lab Sample ID	**Client Sample ID**								
300-8854-6	B3M452	97.0							
300-8854-7	B3M468	94.1							
300-8854-8	B3M464	91.2							
300-8854-9	B3M456	95.4							
LCS 300-16467/2-A	Lab Control Sample	93.9							
MB 300-16467/1-A	Method Blank	91.1							

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16455/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0186	U		0.0686	0.370	0.0538	pCi/g	12/07/18 11:24	12/19/18 15:59	1

Lab Sample ID: LCS 300-16455/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	2.62	2.577		0.198	0.370	0.0662	pCi/g	98	80 - 120

Lab Sample ID: 300-8854-1 DU — **Client Sample ID: B3M420**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16842 — **Prep Batch: 16455**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Co-60	-0.012	U	0.00822	U y	0.0730	0.370	0.0782	pCi/g	1087	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16459/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16847 — **Prep Batch: 16459**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00113	U	0.0284	0.0284	1.00	0.0560	pCi/g	12/07/18 12:21	12/19/18 16:36	1
U-233/234	-0.00113	U	0.0284	0.0284	1.00	0.0560	pCi/g	12/07/18 12:21	12/19/18 16:36	1
U-235/236	-0.000567	U	0.0284	0.0284	1.00	0.0521	pCi/g	12/07/18 12:21	12/19/18 16:36	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*90.2*		*30 - 105*	*12/07/18 12:21*	*12/19/18 16:36*	*1*

Lab Sample ID: LCS 300-16459/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16847 — **Prep Batch: 16459**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	3.59	2.860		0.619	1.00	0.0577	pCi/g	80	80 - 120
U-233/234	3.43	3.409		0.710	1.00	0.0621	pCi/g	99	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*90.1*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8854-1 DU
Matrix: Solid
Analysis Batch: 16847

Client Sample ID: B3M420
Prep Type: Total/NA
Prep Batch: 16459

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.108			0.133		0.0918	1.00	0.0588	pCi/g			21	30
U-233/234	0.109			0.0733	y	0.0676	1.00	0.0588	pCi/g			39	30
U-235/236	0.0155	U		0.0292	U y	0.0424	1.00	0.0547	pCi/g			61	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*83.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16458/1-A
Matrix: Solid
Analysis Batch: 16776

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16458

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00280	U	0.0352	0.0352	1.00	0.0761	pCi/g	12/07/18 12:19	12/18/18 09:19	1
Pu-239/240	-0.00421	U	0.0352	0.0352	1.00	0.0814	pCi/g	12/07/18 12:19	12/18/18 09:19	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.1*		*30 - 105*	*12/07/18 12:19*	*12/18/18 09:19*	*1*

Lab Sample ID: LCS 300-16458/2-A
Matrix: Solid
Analysis Batch: 16776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16458

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.83	4.850		0.932	1.00	0.0953	pCi/g	100	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*93.9*		*30 - 105*

Lab Sample ID: 300-8854-1 DU
Matrix: Solid
Analysis Batch: 16776

Client Sample ID: B3M420
Prep Type: Total/NA
Prep Batch: 16458

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0033	U		0.000	U y	0.0264	1.00	0.0546	pCi/g			200	30
Pu-239/240	0.0103	U		-0.00158	U y	0.0264	1.00	0.0619	pCi/g			273	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*113*	*X*	*30 - 105*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16467/1-A
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16467

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.818	U	0.0685	1.28	15.0	2.18	pCi/g	12/07/18 13:41	12/19/18 21:38	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.1*			*12/07/18 13:41*	*12/19/18 21:38*	*1*

Lab Sample ID: LCS 300-16467/2-A
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16467

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			233	252.0		16.0	15.0	2.23	pCi/g	108	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*93.9*		

Lab Sample ID: 300-8854-1 DU
Matrix: Solid
Analysis Batch: 16884

Client Sample ID: B3M420
Prep Type: Total/NA
Prep Batch: 16467

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.06	U		0.751	U y	1.07	15.0	1.83	pCi/g			34	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*113*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8902-1	B3M428	95.2
300-8902-1 DU	B3M428	96.3
300-8902-2	B3M448	99.7
300-8902-3	B3M444	81.5
300-8902-4	B3M416	91.9
300-8902-5	B3M432	90.0
300-8902-6	B3M424	102
LCS 300-16666/2-A	Lab Control Sample	104
MB 300-16666/1-A	Method Blank	85.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8902-1	B3M428	96.9
300-8902-1 DU	B3M428	81.0
300-8902-2	B3M448	82.5
300-8902-3	B3M444	65.0
300-8902-4	B3M416	65.8
300-8902-5	B3M432	93.7
300-8902-6	B3M424	74.2
LCS 300-16671/2-A	Lab Control Sample	75.2
MB 300-16671/1-A	Method Blank	45.5

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8902-1	B3M428	95.2
300-8902-1 DU	B3M428	96.3
300-8902-2	B3M448	99.7
300-8902-3	B3M444	81.5
300-8902-4	B3M416	91.9
300-8902-5	B3M432	90.0
300-8902-6	B3M424	102
LCS 300-16668/2-A	Lab Control Sample	104
MB 300-16668/1-A	Method Blank	85.6

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16474/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	-0.0137	U		0.0677	0.370	0.0493	pCi/g	12/07/18 14:10	12/19/18 13:54	1

Lab Sample ID: LCS 300-16474/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.415		0.189	0.370	0.121	pCi/g	92	80 - 120		

Lab Sample ID: 300-8902-1 DU — **Client Sample ID: B3M428**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16843 — **Prep Batch: 16474**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.11	U		0.0551	U y	0.0673	0.370	0.0922	pCi/g			603	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16671/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16848 — **Prep Batch: 16671**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00696	U	0.0499	0.0500	1.00	0.119	pCi/g	12/14/18 16:10	12/19/18 16:32	1
U-233/234	-0.00795	U	0.0500	0.0500	1.00	0.122	pCi/g	12/14/18 16:10	12/19/18 16:32	1
U-235/236	-0.000994	U	0.0497	0.0497	1.00	0.0912	pCi/g	12/14/18 16:10	12/19/18 16:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*45.5*		*30 - 105*	*12/14/18 16:10*	*12/19/18 16:32*	*1*

Lab Sample ID: LCS 300-16671/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16848 — **Prep Batch: 16671**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.69	3.204		0.703	1.00	0.0899	pCi/g	87	80 - 120		
U-233/234			3.53	3.646		0.777	1.00	0.0815	pCi/g	103	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*75.2*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8902-1 DU
Matrix: Solid
Analysis Batch: 16848

Client Sample ID: B3M428
Prep Type: Total/NA
Prep Batch: 16671

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.113			0.0973		0.0675	1.00	0.0456	pCi/g			15	30
U-233/234	0.0939			0.141	y	0.0820	1.00	0.0456	pCi/g			40	30
U-235/236	0.0171	U		0.0110	U y	0.0220	1.00	0.0402	pCi/g			44	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*81.0*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16666/1-A
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16666

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00293	U	0.0367	0.0367	1.00	0.0794	pCi/g	12/14/18 15:30	12/19/18 17:52	1
Pu-239/240	-0.00439	U	0.0368	0.0368	1.00	0.0850	pCi/g	12/14/18 15:30	12/19/18 17:52	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*85.6*		*30 - 105*	*12/14/18 15:30*	*12/19/18 17:52*	*1*

Lab Sample ID: LCS 300-16666/2-A
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16666

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.28	4.028		0.751	1.00	0.0772	pCi/g	94	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*104*		*30 - 105*

Lab Sample ID: 300-8902-1 DU
Matrix: Solid
Analysis Batch: 16846

Client Sample ID: B3M428
Prep Type: Total/NA
Prep Batch: 16666

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0040	U		-0.000629	U y	0.0315	1.00	0.0577	pCi/g			146	30
Pu-239/240	-0.0051	U		-0.00189	U y	0.0315	1.00	0.0654	pCi/g			93	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*96.3*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8902-1
SDG: RL8902-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16668/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16885 — **Prep Batch: 16668**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	1.425	U	0.151	1.90	15.0	3.31	pCi/g	12/14/18 15:46	12/20/18 14:44	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*85.6*			*12/14/18 15:46*	*12/20/18 14:44*	*1*

Lab Sample ID: LCS 300-16668/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16885 — **Prep Batch: 16668**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			206	204.5		13.5	15.0	2.68	pCi/g	99	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*104*		

Lab Sample ID: 300-8902-1 DU — **Client Sample ID: B3M428**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16885 — **Prep Batch: 16668**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	1.12	U		-0.426	U y	1.51	15.0	2.79	pCi/g			446	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*96.3*		

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-8933-1	B3MMR5	44.9
300-8933-1 DU	B3MMR5	43.1
LCS 300-16887/2-B	Lab Control Sample	100
MB 300-16887/1-A	Method Blank	48.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-8933-1	B3MMR5	96.2
300-8933-1 DU	B3MMR5	95.3
LCS 300-16909/2-A	Lab Control Sample	76.5
MB 300-16909/1-A	Method Blank	84.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Solid **Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Pu-242 (T)
300-8933-1	B3MMR5	44.9
300-8933-1 DU	B3MMR5	43.1
LCS 300-16901/2-B	Lab Control Sample	100
MB 300-16901/1-A	Method Blank	48.4

Percent Yield (Acceptance Limits)

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-16831/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Co-60	0.0196	U		0.0176	0.370	0.0537	pCi/g	12/19/18 14:24	12/24/18 12:13	1

Lab Sample ID: LCS 300-16831/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			2.62	2.523		0.192	0.370	0.0866	pCi/g	96	80 - 120		

Lab Sample ID: 300-8933-1 DU — **Client Sample ID: B3MMR5**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 16948 — **Prep Batch: 16831**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Co-60	-0.040	U		0.00942	U y	0.0413	0.370	0.0521	pCi/g			325	30

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-16909/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17013 — **Prep Batch: 16909**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.00446	U	0.0280	0.0280	1.00	0.0682	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-233/234	0.00834	U	0.0281	0.0281	1.00	0.0713	pCi/g	12/21/18 11:11	12/27/18 12:40	1
U-235/236	-0.000557	U	0.0279	0.0279	1.00	0.0511	pCi/g	12/21/18 11:11	12/27/18 12:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*84.4*		*30 - 105*	*12/21/18 11:11*	*12/27/18 12:40*	*1*

Lab Sample ID: LCS 300-16909/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 17013 — **Prep Batch: 16909**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			3.53	3.985		0.814	1.00	0.0912	pCi/g	113	80 - 120		
U-233/234			3.37	3.703		0.767	1.00	0.0745	pCi/g	110	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*76.5*		*30 - 105*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17013

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16909

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
U-238	0.0564	U		0.0200	U y	0.0348	1.00	0.0613	pCi/g			95	30
U-233/234	0.00156	U		-0.00489	U y	0.0246	1.00	0.0626	pCi/g			388	30
U-235/236	-0.0016	U		-0.000489	U y	0.0245	1.00	0.0449	pCi/g			105	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*95.3*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-16887/1-A
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16887

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00549	U	0.0688	0.0688	1.00	0.149	pCi/g	12/21/18 08:51	12/27/18 14:05	1
Pu-239/240	0.0604	U	0.0973	0.0980	1.00	0.159	pCi/g	12/21/18 08:51	12/27/18 14:05	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*48.4*		*30 - 105*	*12/21/18 08:51*	*12/27/18 14:05*	*1*

Lab Sample ID: LCS 300-16887/2-B
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16887

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			4.75	5.152		0.954	1.00	0.0837	pCi/g	109	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*100*		*30 - 105*

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17010

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16887

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.0075	U		-0.00661	U	0.0553	1.00	0.128	pCi/g			12	30
Pu-239/240	-0.019	U		0.0198	U y	0.0555	1.00	0.131	pCi/g			6883	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*43.1*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F18-062

TestAmerica Job ID: 300-8933-1
SDG: RL8933-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-16901/1-A
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16901

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	3.279	U	0.344	3.14	15.0	5.91	pCi/g	12/21/18 09:58	12/29/18 07:54	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*48.4*			*12/21/18 09:58*	*12/29/18 07:54*	*1*

Lab Sample ID: LCS 300-16901/2-B
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16901

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			228	240.2		15.8	15.0	2.86	pCi/g	105	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*100*		

Lab Sample ID: 300-8933-1 DU
Matrix: Solid
Analysis Batch: 17052

Client Sample ID: B3MMR5
Prep Type: Total/NA
Prep Batch: 16901

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	5.46			1.662	U y	2.84	15.0	5.52	pCi/g			107	30

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*43.1*		

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	1/22/2019
2. Review No.	
3. Project No.	
	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-013		Jadie Kaas	SGRP QA	MO2216 / 376-2949

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Jadie Kaas 1/22/2019 Jadie Kaas Date Organization Manager (optional) (print and sign)	Date Reviewer/Point of Contact (print and sign) Author/Originator (print and sign)	1/22/2019 Jadie Kaas Date Jadie Kaas Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					closed

A-6004-835 (REV 1)

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
01/22/2019	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR19-013		Scot Fitzgerald	Sample Management and Reporting	MO277/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
01/22/2019 Date; Scot Fitzgerald Organization Manager (optional) (print and sign)	Date; Reviewer/Point of Contact (print and sign); Author/Originator (print and sign)	01/22/2019 Date; Reviewer/Point of Contact (print and sign); Scot Fitzgerald Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No issues noted					Closed

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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR19-013
Project RTL

Chemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date: 01-21-2019**

Technical Review By: Ellen McEntee **Date: 01-21-2019**

Ellen McEntee

Quality Review By: Mary A. Donivan **Date: 01-23-2019**

Mary Donivan
Quality Assurance Manager

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Date: 21 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Semivolatile Organics - Sample Data Groups (SDGs) GEL464711, GEL465312, GEL465548, GEL465897, GEL466068, GEL466524, GEL467080

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL464711, GEL465312, GEL465548, GEL465897, GEL466068, GEL466524 and GEL467080 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3MMT1	11/15/18	Soil	C	WTPH-D, WTPH-G
B3MMP5A	11/15/18	Soil	C	WTPH-G
B3MMT2	11/26/18	Soil	C	WTPH-D, WTPH-G
B3MNB8	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC2	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC3	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC6	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC7	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC8	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNC9	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MND0	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MND1	11/29/18	Soil	C	WTPH-D, WTPH-G
B3MNB7	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MNB9	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MNC0	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MNC1	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MNC4	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MNC5	12/03/18	Soil	C	WTPH-D, WTPH-G
B3MMT3	12/06/18	Soil	C	WTPH-D, WTPH-G

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for method WTPH-D are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirements for method WTPH-G are analysis within 14 days from sample collection. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exceptions.

For SDG GEL466524, sample B3MMT3 was analyzed beyond but within 2X the holding for GRO. The sample result was a non-detect and should be qualified as unusable and flagged "UR."

For SDG GEL467080, sample B3MMT1 was extracted beyond 2X the holding time for DRO. The sample result was a non-detect and should be qualified as unusable and flagged "UR."

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

SDG GEL465897
The o-terphenyl surrogate recoveries for samples B3MNC3, B3MNC6 and B3MND0 were below the lower acceptance limit but ≥10%. The DRO sample results were non-detects and should be qualified as estimates and flagged "UJ."

The bromofluorobenzene surrogate recovery for sample B3MND0 was below the lower acceptance limit but ≥10%. The GRO sample result was a non-detect and should be qualified as an estimate and flagged "UJ."

SDG GEL466068
The o-terphenyl surrogate recoveries for samples B3MNC1 and B3MNB7MSD were below the lower acceptance limit but ≥10%. The DRO result for sample B3MNC1 was a non-detect and should be qualified as an estimate and flagged "UJ." Since sample B3MNB7MSD was a QC sample, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG GEL465897, the MS recovery for GRO was below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466068, the MSD recovery for DRO associated with batch 1829898 was below the lower acceptance limit but ≥20%. The DRO results for samples B3MNB7, B3MNC1, B3MNC4 and B3MNC5 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG GEL466524, the MSD recovery for GRO was below the lower acceptance limit but ≥20%. The GRO result for sample B3MMT3 was a non-detect and would be qualified as an estimate and flagged UJ, but was further qualified as unusable and flagged "UR" due to analysis beyond the holding time.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD were acceptable with the following exception.

For SDG GEL465897, the MS/MSD RPD for GRO was above the acceptance limit. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDGs GEL464711, GEL465312, GEL465548, GEL465897, GEL466068, GEL466524 and GEL467080 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 94.6%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of GRO and DRO as unusable were due to holding time infractions. See the table in Appendix 2 for a listing of all affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to low surrogate recovery, low matrix spike recoveries and poor MS/MSD precision. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: GEL464711, GEL465312, GEL465548, GEL465897, GEL466068, GEL466524, GEL467080	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
GRO	UR	B3MMT3	Analyzed beyond but within 2X the holding time and low matrix spike recovery
DRO	UR	B3MMT1	Extracted beyond 2X the holding time.
DRO	UJ	B3MNC3, B3MNC6, B3MND0, B3MNC1	Low surrogate recoveries
GRO	UJ	B3MND0	Low surrogate recovery, low matrix spike recovery and poor MS/MSD precision
GRO	UJ	B3MNB8, B3MNC2, B3MNC3, B3MNC6, B3MNC7, B3MNC8, B3MNC9, B3MND1	Low matrix spike recovery and poor MS/MSD precision
DRO	UJ	B3MNB7, B3MNC1, B3MNC4, B3MNC5	Low matrix spike recovery

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-013		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/21/19	
			SDG: GEL464711, GEL465312, GEL465548, GEL465897, GEL466068, GEL466524, GEL467080		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G X	WTPH-D X	

SAMPLES/MATRIX: Soil
GEL464711: B3MMT1 GEL465312: B3MMP5A GEL465548: B3MMT2
GEL465897: B3MNB8, B3MNC2, B3MNC3, B3MNC6, B3MNC7, B3MNC8, B3MNC9, B3MND0. B3MND1
GEL466068: B3MNB7, B3MNB9, B3MNC0, B3MNC1, B3MNC4, B3MNC5
GEL466524: B3MMT3
GEL467080: B3MMT1

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

GEL465897: DRO B3MNC3 47%; B3MNC6 47%; B3MND0 52%
GRO B3MND0 54%

GEL466068: DRO B3MNB7MSD 48%, B3MNC1 56%

MS/MSD

GEL465897: GRO MS 49%

GEL466068: DRO MSD 57% (batch 1829898)

GEL466524: MSD GRO 62%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL465897: GRO MS/MSD RPD 44%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SDG GEL466524: GRO was analyzed 21 days after collection

SDG GEL467080: DRO extracted 34 days after collection

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: November 28, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464711**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1826088										
QC1204167548 LCS										
Gasoline Range Organics	500			487	UG/KG		97	(70%-130%)	RXY1	11/27/18 12:27
**Bromofluorobenzene	50.0			48.5	UG/KG		97	(50%-150%)		
QC1204167546 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/27/18 13:23
**Bromofluorobenzene	50.0			43.1	UG/KG		86	(50%-150%)		
QC1204167550 464711002 PS										
Gasoline Range Organics	500	U	0.00	575	ug/L		115	(70%-130%)		11/27/18 16:24
**Bromofluorobenzene	50.0		45.0	42.9	ug/L		86	(50%-150%)		
QC1204167552 464711002 PSD										
Gasoline Range Organics	500	U	0.00	458	ug/L	23*	92	(0%-20%)		11/27/18 16:52
**Bromofluorobenzene	50.0		45.0	45.3	ug/L		91	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL464711

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204167548	LCS for batch 1826085	97
1204167546	MB for batch 1826085	86
464711002	B3MMT1	90
1204167550	B3MMT1PS	86
1204167552	B3MMT1PSD	91

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 3, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465312**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1826649										
QC1204168856 LCS										
Gasoline Range Organics	500			480	UG/KG		96	(70%-130%)	RXY1	11/28/18 12:23
**Bromofluorobenzene	50.0			42.4	UG/KG		85	(50%-150%)		
QC1204169369 LCS										
Gasoline Range Organics	500			441	UG/KG		88	(70%-130%)		11/29/18 13:13
**Bromofluorobenzene	50.0			39.2	UG/KG		78	(50%-150%)		
QC1204168855 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/28/18 12:51
**Bromofluorobenzene	50.0			42.7	UG/KG		85	(50%-150%)		
QC1204169368 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/29/18 13:41
**Bromofluorobenzene	50.0			38.3	UG/KG		77	(50%-150%)		
QC1204168857 465312001 PS										
Gasoline Range Organics	500	U	0.00	387	ug/L		77	(70%-130%)		11/29/18 14:38
**Bromofluorobenzene	50.0		45.2	32.2	ug/L		64	(50%-150%)		
QC1204168860 465312001 PSD										
Gasoline Range Organics	500	U	0.00	506	ug/L	27*	101	(0%-20%)		11/29/18 15:06
**Bromofluorobenzene	50.0		45.2	34.9	ug/L		70	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465312

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204168856	LCS for batch 1826647	85
1204168855	MB for batch 1826647	85
465312001	B3MMP5A	90
1204169369	LCS for batch 1826647	78
1204169368	MB for batch 1826647	77
1204168857	B3MMP5APS	64
1204168860	B3MMP5APSD	70

Surrogate	Acceptance Limits
BFB = Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465548**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1828529											
QC1204172965 LCS											
Diesel Range Organics	66700				69400	UG/KG		104	(70%-130%)	LXA1	12/10/18 04:23
**o-Terphenyl	667				622	UG/KG		93	(50%-150%)		
QC1204172964 MB											
Diesel Range Organics				U	2160	UG/KG					12/10/18 03:43
**o-Terphenyl	666				541	UG/KG		81	(50%-150%)		
QC1204172966 465548001 MS											
Diesel Range Organics	66600	U	2170		65600	UG/KG		98	(70%-130%)		12/10/18 05:41
**o-Terphenyl	666		604		594	UG/KG		89	(50%-150%)		
QC1204172967 465548001 MSD											
Diesel Range Organics	66600	U	2170		68700	UG/KG	5	103	(0%-20%)		12/10/18 06:20
**o-Terphenyl	666		604		614	UG/KG		92	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL465548

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204172964	MB for batch 1828518	81
1204172965	LCS for batch 1828518	93
465548001	B3MMT2	91
1204172966	B3MMT2MS	89
1204172967	B3MMT2MSD	92

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 8, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465548**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1826649										
QC1204168856 LCS										
Gasoline Range Organics	500			480	UG/KG		96	(70%-130%)	RXY1	11/28/18 12:23
**Bromofluorobenzene	50.0			42.4	UG/KG		85	(50%-150%)		
QC1204169369 LCS										
Gasoline Range Organics	500			441	UG/KG		88	(70%-130%)		11/29/18 13:13
**Bromofluorobenzene	50.0			39.2	UG/KG		78	(50%-150%)		
QC1204168855 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/28/18 12:51
**Bromofluorobenzene	50.0			42.7	UG/KG		85	(50%-150%)		
QC1204169368 MB										
Gasoline Range Organics			U	16.7	UG/KG					11/29/18 13:41
**Bromofluorobenzene	50.0			38.3	UG/KG		77	(50%-150%)		
QC1204168858 465548001 PS										
Gasoline Range Organics	500	U	0.00	420	ug/L		84	(70%-130%)		11/29/18 20:20
**Bromofluorobenzene	50.0		33.2	40.5	ug/L		81	(50%-150%)		
QC1204168861 465548001 PSD										
Gasoline Range Organics	500	U	0.00	433	ug/L	3	87	(0%-20%)		11/29/18 20:49
**Bromofluorobenzene	50.0		33.2	39.4	ug/L		79	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465548

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204168856	LCS for batch 1826647	85
1204168855	MB for batch 1826647	85
465548001	B3MMT2	66
1204169369	LCS for batch 1826647	78
1204169368	MB for batch 1826647	77
1204168858	B3MMT2PS	81
1204168861	B3MMT2PSD	79

Surrogate	Acceptance Limits
BFB = Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465897**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1829898											
QC1204176138 LCS											
Diesel Range Organics	66500				54000	UG/KG		81	(70%-130%)	LXA1	12/12/18 13:40
**o-Terphenyl	665				461	UG/KG		69	(50%-150%)		
QC1204176137 MB											
Diesel Range Organics				U	2130	UG/KG					12/12/18 13:02
**o-Terphenyl	657				421	UG/KG		64	(50%-150%)		
QC1204176139 465897010 MS											
Diesel Range Organics	72000	U	2310		55200	UG/KG		77	(70%-130%)		12/12/18 14:58
**o-Terphenyl	720		485		505	UG/KG		70	(50%-150%)		
QC1204176140 465897010 MSD											
Diesel Range Organics	71500	U	2310		57700	UG/KG	4	81	(0%-20%)		12/12/18 15:36
**o-Terphenyl	715		485		536	UG/KG		75	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL465897

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204176137	MB for batch 1829897	64
1204176138	LCS for batch 1829897	69
465897010	B3MNB8	68
1204176139	B3MNB8MS	70
1204176140	B3MNB8MSD	75
465897011	B3MNC2	71
465897012	B3MNC3	47 *
465897013	B3MNC6	47 *
465897014	B3MNC7	70
465897015	B3MNC8	65
465897016	B3MNC9	62
465897017	B3MND0	52
465897018	B3MND1	69

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 12, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465897**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1828166										
QC1204172219 LCS										
Gasoline Range Organics	500			548	UG/KG		110	(70%-130%)	RXY1	12/06/18 12:08
**Bromofluorobenzene	50.0			37.9	UG/KG		76	(50%-150%)		
QC1204175416 LCS										
Gasoline Range Organics	500			443	UG/KG		89	(70%-130%)		12/10/18 12:38
**Bromofluorobenzene	50.0			40.9	UG/KG		82	(50%-150%)		
QC1204172218 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/06/18 12:36
**Bromofluorobenzene	50.0			41.2	UG/KG		82	(50%-150%)		
QC1204175415 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/10/18 13:06
**Bromofluorobenzene	50.0			36.8	UG/KG		74	(50%-150%)		
QC1204172220 465897014 PS										
Gasoline Range Organics	500	TU	0.00	383	ug/L		77	(70%-130%)		12/10/18 17:02
**Bromofluorobenzene	50.0		36.4	33.1	ug/L		66	(50%-150%)		
QC1204172221 465897014 PSD										
Gasoline Range Organics	500	TU	0.00 T	244	ug/L	44*	49*	(0%-20%)		12/10/18 17:30
**Bromofluorobenzene	50.0		36.4	30.1	ug/L		60	(50%-150%)		

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL465897

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204172219	LCS for batch 1828166	76
1204172218	MB for batch 1828166	82
465897010	B3MNB8	71
465897011	B3MNC2	65
465897012	B3MNC3	76
465897013	B3MNC6	76
1204175416	LCS for batch 1828165	82
1204175415	MB for batch 1828165	74
465897014	B3MNC7	73
465897015	B3MNC8	85
465897016	B3MNC9	81
465897017	B3MND0	54
465897018	B3MND1	71
1204172220	B3MNC7PS	66
1204172221	B3MNC7PSD	60

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466068**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1829898											
QC1204176138 LCS											
Diesel Range Organics	66500				54000	UG/KG		81	(70%-130%)	LXA1	12/12/18 13:40
**o-Terphenyl	665				461	UG/KG		69	(50%-150%)		
QC1204176137 MB											
Diesel Range Organics				U	2130	UG/KG					12/12/18 13:02
**o-Terphenyl	657				421	UG/KG		64	(50%-150%)		
QC1204176141 466068007 MS											
Diesel Range Organics	71500	TU	2300		51300	UG/KG		72	(70%-130%)		12/12/18 23:22
**o-Terphenyl	715		464		482	UG/KG		67	(50%-150%)		
QC1204176142 466068007 MSD											
Diesel Range Organics	71600	TU	2300	T	40500	UG/KG	23*	57*	(0%-20%)		12/13/18 00:01
**o-Terphenyl	716		464		346	UG/KG		48*	(50%-150%)		
Batch 1831910											
QC1204180636 LCS											
Diesel Range Organics	66600				67600	UG/KG		102	(70%-130%)	LXA1	12/15/18 17:21
**o-Terphenyl	666				681	UG/KG		102	(50%-150%)		
QC1204180635 MB											
Diesel Range Organics				U	2170	UG/KG					12/15/18 16:42
**o-Terphenyl	667				554	UG/KG		83	(50%-150%)		

QC Summary

Workorder: **466068**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics												
Batch 1831910												
QC1204180641 466524002 MS												
Diesel Range Organics	66600	U	2170		75500	UG/KG		113	(70%-130%)	LXA1	12/15/18	21:13
**o-Terphenyl	666		481		722	UG/KG		108	(50%-150%)			
QC1204180642 466524002 MSD												
Diesel Range Organics	66600	U	2170		72200	UG/KG	4	108	(0%-20%)		12/15/18	21:52
**o-Terphenyl	666		481		686	UG/KG		103	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466068

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204176137	MB for batch 1829897	64
1204176138	LCS for batch 1829897	69
466068007	B3MNB7	65
1204176141	B3MNB7MS	67
1204176142	B3MNB7MSD	48 *
466068010	B3MNC1	56
466068011	B3MNC4	69
466068012	B3MNC5	64
1204180635	MB for batch 1831909	83
1204180636	LCS for batch 1831909	102
466068008	B3MNB9	77
466068009	B3MNC0	74
1204180641	B3MMT3MS	108
1204180642	B3MMT3MSD	103

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 19, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466068**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1829740										
QC1204175769 LCS										
Gasoline Range Organics	500			517	UG/KG		103	(70%-130%)	RXY1	12/11/18 12:10
**Bromofluorobenzene	50.0			42.8	UG/KG		86	(50%-150%)		
QC1204175766 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/11/18 12:38
**Bromofluorobenzene	50.0			42.7	UG/KG		85	(50%-150%)		
QC1204175772 466068008 PS										
Gasoline Range Organics	500	U	0.00	372	ug/L		74	(70%-130%)		12/11/18 20:22
**Bromofluorobenzene	50.0		40.3	34.0	ug/L		68	(50%-150%)		
QC1204175775 466068008 PSD										
Gasoline Range Organics	500	U	0.00	353	ug/L	5	71	(0%-20%)		12/11/18 20:50
**Bromofluorobenzene	50.0		40.3	36.1	ug/L		72	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466068

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204175769	LCS for batch 1829739	86
1204175766	MB for batch 1829739	85
466068007	B3MNB7	78
466068008	B3MNB9	81
466068009	B3MNC0	76
466068010	B3MNC1	73
466068011	B3MNC4	74
466068012	B3MNC5	64
1204175772	B3MNB9PS	68
1204175775	B3MNB9PSD	72

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 17, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466524**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1831910											
QC1204180636 LCS											
Diesel Range Organics	66600				67600	UG/KG		102	(70%-130%)	LXA1	12/15/18 17:21
**o-Terphenyl	666				681	UG/KG		102	(50%-150%)		
QC1204180635 MB											
Diesel Range Organics				U	2170	UG/KG					12/15/18 16:42
**o-Terphenyl	667				554	UG/KG		83	(50%-150%)		
QC1204180641 466524002 MS											
Diesel Range Organics	66600	U	2170		75500	UG/KG		113	(70%-130%)		12/15/18 21:13
**o-Terphenyl	666		481		722	UG/KG		108	(50%-150%)		
QC1204180642 466524002 MSD											
Diesel Range Organics	66600	U	2170		72200	UG/KG	4	108	(0%-20%)		12/15/18 21:52
**o-Terphenyl	666		481		686	UG/KG		103	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL466524

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204180635	MB for batch 1831909	83
1204180636	LCS for batch 1831909	102
466524002	B3MMT3	72
1204180641	B3MMT3MS	108
1204180642	B3MMT3MSD	103

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 28, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466524**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics										
Batch 1833122										
QC1204183348 LCS										
Gasoline Range Organics	500			388	UG/KG		78	(70%-130%)	RXY1	12/26/18 12:28
**Bromofluorobenzene	50.0			47.7	UG/KG		95	(50%-150%)		
QC1204183347 MB										
Gasoline Range Organics			U	16.7	UG/KG					12/26/18 12:56
**Bromofluorobenzene	50.0			45.6	UG/KG		91	(50%-150%)		
QC1204183349 466524002 PS										
Gasoline Range Organics	500 TUX	0.00	X	350	ug/L		70	(70%-130%)		12/27/18 03:29
**Bromofluorobenzene	50.0	41.9		36.9	ug/L		74	(50%-150%)		
QC1204183351 466524002 PSD										
Gasoline Range Organics	500 TUX	0.00	TX	310	ug/L	12	62 *	(0%-20%)		12/27/18 03:58
**Bromofluorobenzene	50.0	41.9		38.4	ug/L		77	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

GC Volatiles (GRO)

Surrogate Recovery Report

SDG Number: GEL466524

Matrix Type: SOLID

Sample ID	Client ID	BFB %REC
1204183348	LCS for batch 1833122	95
1204183347	MB for batch 1833122	91
466524002	B3MMT3	84
1204183349	B3MMT3PS	74
1204183351	B3MMT3PSD	77

Surrogate		Acceptance Limits
BFB	= Bromofluorobenzene	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **467080**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1833074											
QC1204183229 LCS											
Diesel Range Organics	66700				58100	UG/KG		87	(70%-130%)	LXA1	12/21/18 01:51
**o-Terphenyl	667				583	UG/KG		87	(50%-150%)		
QC1204183228 MB											
Diesel Range Organics				U	2170	UG/KG					12/21/18 01:11
**o-Terphenyl	667				497	UG/KG		75	(50%-150%)		
QC1204183230 466597020 MS											
Diesel Range Organics	77700	U	2520		60900	UG/KG		78	(70%-130%)		12/21/18 10:32
**o-Terphenyl	777		627		578	UG/KG		74	(50%-150%)		
QC1204183231 466597020 MSD											
Diesel Range Organics	90100	U	2520		77200	UG/KG	24*	86	(0%-20%)		12/21/18 11:12
**o-Terphenyl	901		627		782	UG/KG		87	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL467080

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1204183228	MB for batch 1833074	75
1204183229	LCS for batch 1833074	87
1204183230	B3MN24MS	74
1204183231	B3MN24MSD	87
467080001	B3MMT1	86

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(50%-150%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 21 January 2019
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: RTL
Subject: Herbicides - Sample Data Groups (SDGs) GEL464711, GEL465548, GEL465897, GEL466068, GEL466524

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL464711, GEL465548, GEL465897, GEL466068 and GEL466524 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B3MMP4	11/15/18	Soil	C	8151A
B3MMP8	11/26/18	Soil	C	8151A
B3M433	11/29/18	Soil	C	8151A
B3M437	11/29/18	Soil	C	8151A
B3M449	11/29/18	Soil	C	8151A
B3M453	11/29/18	Soil	C	8151A
B3M457	11/29/18	Soil	C	8151A
B3M417	11/29/18	Soil	C	8151A
B3M461	11/29/18	Soil	C	8151A
B3M465	11/29/18	Soil	C	8151A
B3M469	11/29/18	Soil	C	8151A
B3M413	12/03/18	Soil	C	8151A
B3M421	12/03/18	Soil	C	8151A
B3M425	12/03/18	Soil	C	8151A
B3M429	12/03/18	Soil	C	8151A
B3M441	12/03/18	Soil	C	8151A
B3M445	12/03/18	Soil	C	8151A
B3MMR2	12/06/18	Soil	C	8151A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan, S740277-PLAN-16, R0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for herbicides is extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample and matrix spike sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL465897 the 2,4-dichlorophenylacetic acid (DCAA) surrogate recoveries for sample B3M417 on both columns were below the lower acceptance limit but ≥10%. All sample results were non-detects and should be qualified as estimates and flagged "UJ."

For SDG GEL466068, the DCAA surrogate recovery on the primary column for sample B3M413MSD was above the upper acceptance limit. Since the sample was a QC sample, data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

SDG GEL467111
The MS and MSD recoveries for dinoseb were < 20%. The dinoseb result for sample B3MMP4 was a non-detect and should be qualified as unusable and flagged "UR."

The MS and/or MSD recoveries for dalapon, dichlorprop, MCPA and MCPP were below the lower acceptance limit but ≥20%. The results for sample B3MPP4 were non-detects and should be qualified as estimates and flagged "UJ."

SDG GEL465897
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for dalapon, dicamba and MCPA were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

SDG GEL466068
The MS and MSD recoveries for dinoseb were <20%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." See the table in Appendix 2 for a listing of affected samples.

The MS and/or MSD recoveries for dalapon and MCPA were below the lower acceptance limit but ≥20%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

SDG GEL466524
The MS and MD recoveries dinoseb were <20%. The result for sample B3MMR2 was a non-detects and should be qualified as unusable and flagged "UR."

The MS and MSD recoveries for dalapon were below the lower acceptance limit but ≥20%. The dalapon result for sample B3MMR2 was a non-detect and should be qualified as an estimate and flagged "UJ."

Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable with the following exceptions.

For SDG GEL465548, the LCS and/or LCSD recoveries for dalapon, dinoseb and MCPA were below the lower acceptance limit. All associated results for sample B3MMP8 were non-detects and based on professional judgment should be qualified and flagged "UJ."

For SDG GEL465897, the LCS recovery for dalapon was below the lower acceptance limit. All associated sample results were non-detects and based on professional judgment should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466068 the LCS recovery for dinoseb was <20%. All associated sample results were non-detects and based on professional judgment, data should be qualified as unusable and flagged "UR". The LCS recovery for dalapon was below the lower acceptance limit. All sample results were non-detects and based on professional judgment data should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples.

For SDG GEL466524, the LCS recoveries for dalapon and dinoseb were below the lower acceptance limit. The results for sample B3MMR2 were non-detects and based on professional judgment the dalapon result should be qualified as an estimate and flagged "UJ." The dinoseb result would be qualified as an estimate and flagged UJ, but was further qualified as unusable and flagged "UR" due to very low matrix spike recoveries.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable with the following exceptions.

For SDG GEL466068, the MS/MSD RPD for dinoseb was above the upper acceptance limit. All associated sample results were non-detects and would be qualified as estimates and flagged UJ, but were further qualified as unusable and flagged "UR" due to very low matrix spike and LCS recoveries. See the table in Appendix 2 for a listing of affected samples.

For SDG GEL466524, the MS/MSD RPD for dinoseb was above the upper acceptance limit. The dinoseb result for sample B3MMR2 was a non-detect and would be qualified as an estimate and flagged UJ, but was further qualified as unusable and flagged "UR" due to very low matrix spike recoveries.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

CRDLs for herbicides were not provided in the SAP.

- **Completeness**

SDGs GEL464711, GEL465548, GEL465897, GEL466068 and GEL466524 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 91%.

MAJOR DEFICIENCIES

Major deficiencies leading to qualification of dinoseb results as unusable were due to very low matrix spike and/or very low LCS recoveries. See the table in Appendix 2 for a listing of affected samples.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of the sample results as estimates were due to low surrogate recoveries, poor MS/MSD precision, low matrix spike recovery and low LCS recoveries. See the table in Appendix 2 for a listing of affected samples..

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

S740277-PLAN-16, R0, *Research Technology Laboratory (RTL) Disposition: Final Verification Sampling and Analysis Plan,* February 2018.

S740277-PLAN-14, R0, *Research Technology Laboratory (RTL) Disposition Program: Final Status Survey Plan,* February 2018.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Pesticide & Herbicide Data Qualification Summary			
SDGs: GEL464711, GEL465548, GEL465897, GEL466068, GEL466524	Reviewer: AQA	Project: RTL	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dichlorprop, MCPP	UJ	B3M417	Low surrogate recoveries
dalapon, dicamba, MCPA	UJ	B3M417	Low surrogate recoveries and low matrix spike recoveries
dinoseb	UR	B3M417	Low surrogate recoveries and very low matrix spike recoveries
dinoseb	UR	B3MMP4, B3M433, B3M437, B3M449, B3M453, B3M457, B3M461, B3M465, B3M469	Very low matrix spike recoveries
dalapon, dichlorprop, MCPA, MCPP	UJ	B3MMP4	Low matrix spike recoveries
dicamba, MCPA	UJ	B3M433, B3M437, B3M449, B3M453, B3M457, B3M461, B3M465, B3M469	Low matrix spike recoveries
dalapon	UJ	B3M433, B3M437, B3M449, B3M453, B3M457, B3M461, B3M465, B3M469	Low matrix spike recoveries and low LCS recovery
MCPA	UJ	B3M413, B3M421, B3M425, B3M429, B3M441, B3M445	Low matrix spike recoveries
dalapon	UJ	B3M413, B3M421, B3M425, B3M429, B3M441, B3M445	Low matrix spike and low LCS recoveries
dinoseb	UR	B3M413, B3M421, B3M425, B3M429,	Very low matrix spike recoveries, very low

		B3M441, B3M445	LCS recoveries and poor MS/MSD precision
dinoseb	UR	B3MMR2	Very low matrix spike recoveries, low LCS recovery and poor MS/MSD precision
dalapon	UJ	B3MMR2	Low matrix spike and low LCS recoveries
dalapon, dinoseb, MCPA	UJ	B3MMP8	Low LCS and/or LCSD recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RTL			DATA PACKAGE: VSR19-013		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 01/21/19	
			SDG: GEL464711, GEL465548, GEL465897, GEL466068, GEL466524		
ANALYSES PERFORMED					
8015	8021	8141	8151 X	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX: Soil					
GEL464711: B3MMP4					
GEL465548: B3MMP8					
GEL465897: B3M433, B3M437, B3M449, B3M453, B3M457, B3M417, B3M461, B3M465, B3M469					
GEL466068: B3M413, B3M421, B3M425, B3M429, B3M441, B3M445					
GEL466524: B3MMR2					

1. **DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

Technical verification documentation present?	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

Surrogate

SDG GEL465897: DCAA1/DCAA2 B3M417 41%/53%

SDG GEL466068: B3M413MSD 153% (DCAA1)

MS/MSD

SDG GEL465548 - no MS/MSD analyzed

SDG GEL464711 dalapon 56%/53%; dichlorprop 68% (MS), dinoseb 0%/0%, MCPA 58%/65%, MCPP 62%/66%

SDG GEL465897: dalapon 33%/34%, dicamba 69% (MS), dinoseb 6%/6%, MCPA 60%/54%

SDG GEL466068: dalapon 62%/69%, dinoseb 6%/11%, MCPA 69%(MS)

SDG GEL466524: dalapon 53%/64%, dinoseb 5%/19%

LCS

GEL465548: dalapon 46%/44%, dinoseb 57%/66%, MCPA 66% (LCSD)

GEL465897: dalapon 45%

GEL466068: dalapon 65%, dinoseb 0%

GEL466524: dalapon 46%, dinoseb 55%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG GEL466068: RPD dinoseb 59%

SDG GEL466524: RPD dinoseb 111%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

CRDLs were not provided.

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No N/A
Lot check performed?	Yes No N/A
Check recoveries acceptable?	Yes No N/A
Check materials traceable?	Yes No N/A
Check materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

Herbicide

Surrogate Recovery Report

SDG Number: GEL464711

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204166098	MB for batch 1825403	101	103
1204166099	LCS for batch 1825403	112	109
464711001	B3MMP4	91	96
1204166101	B3MMP4MS	82	79
1204166103	B3MMP4MSD	84	81

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

QC Summary

Report Date: November 30, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **464711**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1825405											
QC1204166099 LCS											
2,4,5-T	40.0			46.4	ug/kg		116	(60%-139%)	LOF	11/29/18	22:19
2,4,5-TP	40.0			39.9	ug/kg		100	(62%-140%)			
2,4-D	40.0			41.6	ug/kg		104	(55%-140%)			
2,4-DB	40.0			37.4	ug/kg		94	(51%-152%)			
Dalapon	400			403	ug/kg		101	(32%-110%)			
Dicamba	40.0			39.9	ug/kg		100	(53%-135%)			
Dichlorprop	40.0			37.3	ug/kg		93	(52%-136%)			
Dinoseb	40.0			39.3	ug/kg		98	(24%-104%)			
MCPA	4000			3510	ug/kg		88	(44%-142%)			
MCPP	4000			3380	ug/kg		85	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			109	ug/kg		109	(37%-149%)			
QC1204166098 MB											
2,4,5-T			U	1.66	ug/kg					11/29/18	21:50
2,4,5-TP			U	1.66	ug/kg						

QC Summary

Workorder: **464711**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1825405											
2,4-D				U	1.66	ug/kg				LOF	11/29/18 21:50
2,4-DB				U	1.66	ug/kg					
Dalapon				U	35.0	ug/kg					
Dicamba				U	2.00	ug/kg					
Dichlorprop				U	2.26	ug/kg					
Dinoseb				U	1.66	ug/kg					
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	99.9				101	ug/kg		101	(37%-149%)		
QC1204166101 464711001 MS											
2,4,5-T	40.0	U	1.66		35.2	ug/kg		88	(39%-144%)		11/29/18 23:15
2,4,5-TP	40.0	U	1.66		29.7	ug/kg		74	(40%-146%)		
2,4-D	40.0	U	1.66		30.3	ug/kg		76	(40%-149%)		
2,4-DB	40.0	U	1.66		28.6	ug/kg		72	(29%-160%)		
Dalapon	400	U	35.0		224	ug/kg		56	(19%-132%)		
Dicamba	40.0	U	2.00		28.9	ug/kg		72	(46%-135%)		

QC Summary

Workorder: **464711**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1825405											
Dichlorprop	40.0	U	2.26		27.2	ug/kg		68	(38%-145%)	LOF	11/29/18 23:15
Dinoseb	40.0	TU	1.66	TU	1.66	ug/kg		0*	(20%-118%)		
MCPA	4000	U	230		2330	ug/kg		58	(29%-154%)		
MCPP	4000	U	200		2480	ug/kg		62	(30%-135%)		
**2,4-Dichlorophenylacetic acid	99.9		90.5		81.5	ug/kg		82	(37%-149%)		
QC1204166103 464711001 MSD											
2,4,5-T	39.9	U	1.66		36.2	ug/kg	3	91	(0%-30%)		11/29/18 23:44
2,4,5-TP	39.9	U	1.66		30.7	ug/kg	3	77	(0%-30%)		
2,4-D	39.9	U	1.66		31.9	ug/kg	5	80	(0%-30%)		
2,4-DB	39.9	U	1.66		32.2	ug/kg	12	81	(0%-30%)		
Dalapon	399	U	35.0		212	ug/kg	6	53	(0%-30%)		
Dicamba	39.9	U	2.00		29.6	ug/kg	3	74	(0%-30%)		
Dichlorprop	39.9	U	2.26		28.7	ug/kg	5	72	(0%-30%)		
Dinoseb	39.9	TU	1.66	TU	1.66	ug/kg	N/A	0*	(0%-30%)		
MCPA	3990	U	230		2600	ug/kg	11	65	(0%-30%)		
MCPP	3990	U	200		2630	ug/kg	6	66	(0%-30%)		

QC Summary

Workorder: **464711**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1825405											
**2,4-Dichlorophenylacetic acid	99.7	90.5		83.8	ug/kg		84	(37%-149%)	LOF	11/29/18	23:44

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL465548

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204173777	MB for batch 1828874	110	130
1204173778	LCS for batch 1828874	111	113
1204176070	LCSD for batch 1828874	99	99
465548002	B3MMP8	109	107

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 11, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465548**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828879										
QC1204173778 LCS										
2,4,5-T	39.9			35.9	ug/kg		90	(60%-139%)	LOF	12/07/18 18:46
2,4,5-TP	39.9			36.3	ug/kg		91	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			33.8	ug/kg		85	(51%-152%)		
Dalapon	399			184	ug/kg		46	(32%-110%)		
Dicamba	39.9			34.3	ug/kg		86	(53%-135%)		
Dichlorprop	39.9			33.6	ug/kg		84	(52%-136%)		
Dinoseb	39.9			22.9	ug/kg		57	(24%-104%)		
MCPA	3990			2870	ug/kg		72	(44%-142%)		
MCPP	3990			2880	ug/kg		72	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.8			111	ug/kg		111	(37%-149%)		
QC1204176070 LCSD										
2,4,5-T	40.0			33.2	ug/kg	8	83	(0%-30%)		12/07/18 19:15
2,4,5-TP	40.0			32.1	ug/kg	12	80	(0%-30%)		

QC Summary

Workorder: **465548**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828879										
2,4-D	40.0			31.3	ug/kg	8	78	(0%-30%)	LOF	12/07/18 19:15
2,4-DB	40.0			36.9	ug/kg	9	92	(0%-30%)		
Dalapon	400		P	177	ug/kg	4	44	(0%-30%)		
Dicamba	40.0			32.4	ug/kg	6	81	(0%-30%)		
Dichlorprop	40.0			30.1	ug/kg	11	75	(0%-30%)		
Dinoseb	40.0			26.4	ug/kg	14	66	(0%-30%)		
MCPA	4000			2650	ug/kg	8	66	(0%-30%)		
MCPP	4000			2830	ug/kg	2	71	(0%-30%)		
**2,4-Dichlorophenylacetic acid	100			98.7	ug/kg		99	(37%-149%)		
QC1204173777 MB										
2,4,5-T			U	1.65	ug/kg					12/07/18 18:18
2,4,5-TP			U	1.65	ug/kg					
2,4-D			U	1.65	ug/kg					
2,4-DB			U	1.65	ug/kg					
Dalapon			U	34.7	ug/kg					
Dicamba			U	1.99	ug/kg					

QC Summary

Workorder: **465548**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828879											
Dichlorprop			U	2.24	ug/kg				LOF	12/07/18	18:18
Dinoseb			U	1.65	ug/kg						
MCPA			U	228	ug/kg						
MCPP			U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.3			110	ug/kg		110	(37%-149%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL465897

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204172568	MB for batch 1828334	99	111
1204172569	LCS for batch 1828334	127	121
465897001	B3M433	90	107
1204172570	B3M433MS	90	94
1204172571	B3M433MSD	90	95
465897002	B3M437	88	99
465897003	B3M449	65	85
465897004	B3M453	90	107
465897005	B3M457	91	103
465897006	B3M417	41	53
465897007	B3M461	77	94
465897008	B3M465	77	98
465897009	B3M469	72	94

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 13, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **465897**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828335											
QC1204172569 LCS											
2,4,5-T	40.0			39.4	ug/kg		99	(60%-139%)	LOF	12/11/18	17:30
2,4,5-TP	40.0			42.0	ug/kg		105	(62%-140%)			
2,4-D	40.0			37.8	ug/kg		95	(55%-140%)			
2,4-DB	40.0			40.5	ug/kg		101	(51%-152%)			
Dalapon	400			178	ug/kg		45	(32%-110%)			
Dicamba	40.0			38.4	ug/kg		96	(53%-135%)			
Dichlorprop	40.0			38.1	ug/kg		95	(52%-136%)			
Dinoseb	40.0			40.4	ug/kg		101	(24%-104%)			
MCPA	4000			3270	ug/kg		82	(44%-142%)			
MCPP	4000			3500	ug/kg		87	(39%-138%)			
**2,4-Dichlorophenylacetic acid	100			121	ug/kg		121	(37%-149%)			
QC1204172568 MB											
2,4,5-T			U	1.66	ug/kg					12/11/18	17:02
2,4,5-TP			U	1.66	ug/kg						

QC Summary

Workorder: **465897**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1828335										
2,4-D			U	1.66	ug/kg				LOF	12/11/18 17:02
2,4-DB			U	1.66	ug/kg					
Dalapon			U	35.0	ug/kg					
Dicamba			U	2.00	ug/kg					
Dichlorprop			U	2.26	ug/kg					
Dinoseb			U	1.66	ug/kg					
MCPA			U	230	ug/kg					
MCPP			U	200	ug/kg					
**2,4-Dichlorophenylacetic acid	99.9			99.3	ug/kg		99	(37%-149%)		
QC1204172570 465897001 MS										
2,4,5-T	43.1	U	1.79	34.0	ug/kg		79	(39%-144%)		12/11/18 18:55
2,4,5-TP	43.1	U	1.79	36.6	ug/kg		85	(40%-146%)		
2,4-D	43.1	U	1.79	31.3	ug/kg		73	(40%-149%)		
2,4-DB	43.1	U	1.79	35.1	ug/kg		82	(29%-160%)		
Dalapon	431	U	37.8	141	ug/kg		33	(19%-132%)		
Dicamba	43.1	U	2.16	29.8	ug/kg		69	(46%-135%)		

QC Summary

Workorder: **465897**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1828335											
Dichlorprop	43.1	U	2.44		30.8	ug/kg		71	(38%-145%)	LOF	12/11/18 18:55
Dinoseb	43.1	TU	1.79	JT	2.68	ug/kg		6*	(20%-118%)		
MCPA	4310	U	248		2600	ug/kg		60	(29%-154%)		
MCPP	4310	U	216		3160	ug/kg		73	(30%-135%)		
**2,4-Dichlorophenylacetic acid	108		97.3		96.5	ug/kg		90	(37%-149%)		
QC1204172571 465897001 MSD											
2,4,5-T	43.0	U	1.79		34.3	ug/kg	1	80	(0%-30%)		12/11/18 19:23
2,4,5-TP	43.0	U	1.79		37.1	ug/kg	2	86	(0%-30%)		
2,4-D	43.0	U	1.79		31.1	ug/kg	1	72	(0%-30%)		
2,4-DB	43.0	U	1.79		35.4	ug/kg	1	82	(0%-30%)		
Dalapon	430	U	37.8		144	ug/kg	3	34	(0%-30%)		
Dicamba	43.0	U	2.16		29.9	ug/kg	1	70	(0%-30%)		
Dichlorprop	43.0	U	2.44		31.0	ug/kg	1	72	(0%-30%)		
Dinoseb	43.0	TU	1.79	JT	2.70	ug/kg	1	6*	(0%-30%)		
MCPA	4300	U	248	P	2330	ug/kg	11	54	(0%-30%)		
MCPP	4300	U	216		3100	ug/kg	2	72	(0%-30%)		

QC Summary

Workorder: **465897**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1828335											
**2,4-Dichlorophenylacetic acid	107	97.3		96.6	ug/kg		90	(37%-149%)	LOF	12/11/18	19:23

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL466068

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204177436	MB for batch 1830383	69	79
1204177437	LCS for batch 1830383	128	119
466068001	B3M413	86	108
1204177438	B3M413MS	126	119
1204177440	B3M413MSD	153 *	113
466068002	B3M421	84	120
466068003	B3M425	86	106
466068004	B3M429	81	103
466068005	B3M441	80	101
466068006	B3M445	84	110

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 30, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466068**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
QC1204177437 LCS											
2,4,5-T	39.9			41.3	ug/kg		104	(60%-139%)	LOF	12/13/18	16:44
2,4,5-TP	39.9			42.2	ug/kg		106	(62%-140%)			
2,4-D	39.9			39.0	ug/kg		98	(55%-140%)			
2,4-DB	39.9			42.2	ug/kg		106	(51%-152%)			
Dalapon	399			261	ug/kg		65	(32%-110%)			
Dicamba	39.9			39.4	ug/kg		99	(53%-135%)			
Dichlorprop	39.9			37.7	ug/kg		94	(52%-136%)			
Dinoseb	39.9		U	1.65	ug/kg		0 *	(24%-104%)			
MCPA	3990			3110	ug/kg		78	(44%-142%)			
MCPP	3990			3480	ug/kg		87	(39%-138%)			
**2,4-Dichlorophenylacetic acid	99.7			119	ug/kg		119	(37%-149%)			
QC1204177436 MB											
2,4,5-T			U	1.65	ug/kg					12/13/18	16:24
2,4,5-TP			U	1.65	ug/kg						

QC Summary

Workorder: **466068**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB												
Batch 1830390												
2,4-D				U	1.65	ug/kg				LOF	12/13/18	16:24
2,4-DB				U	1.65	ug/kg						
Dalapon				U	34.8	ug/kg						
Dicamba				U	1.99	ug/kg						
Dichlorprop				U	2.25	ug/kg						
Dinoseb				U	1.65	ug/kg						
MCPA				U	229	ug/kg						
MCPP				U	199	ug/kg						
**2,4-Dichlorophenylacetic acid	99.4				68.8	ug/kg		69	(37%-149%)			
QC1204177438 466068001 MS												
2,4,5-T	42.8	U	1.79		44.3	ug/kg		103	(39%-144%)		12/13/18	18:47
2,4,5-TP	42.8	U	1.79		46.1	ug/kg		108	(40%-146%)			
2,4-D	42.8	U	1.79		40.5	ug/kg		95	(40%-149%)			
2,4-DB	42.8	U	1.79		43.3	ug/kg		101	(29%-160%)			
Dalapon	428	U	37.7		310	ug/kg		72	(19%-132%)			
Dicamba	42.8	U	2.15		44.1	ug/kg		103	(46%-135%)			

QC Summary

Workorder: **466068**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1830390											
Dichlorprop	42.8	U	2.43		38.7	ug/kg		90	(38%-145%)	LOF	12/13/18 18:47
Dinoseb	42.8	TU	1.79	JT	2.51	ug/kg		6*	(20%-118%)		
MCPA	4280	U	248		2970	ug/kg		69	(29%-154%)		
MCPP	4280	U	215		3950	ug/kg		92	(30%-135%)		
**2,4-Dichlorophenylacetic acid	107		92.9		135	ug/kg		126	(37%-149%)		
QC1204177440 466068001 MSD											
2,4,5-T	43.0	U	1.79		41.1	ug/kg	8	96	(0%-30%)		12/13/18 19:15
2,4,5-TP	43.0	U	1.79		41.2	ug/kg	11	96	(0%-30%)		
2,4-D	43.0	U	1.79		36.5	ug/kg	10	85	(0%-30%)		
2,4-DB	43.0	U	1.79		38.9	ug/kg	11	91	(0%-30%)		
Dalapon	430	U	37.7		266	ug/kg	15	62	(0%-30%)		
Dicamba	43.0	U	2.15		41.3	ug/kg	6	96	(0%-30%)		
Dichlorprop	43.0	U	2.43		53.9	ug/kg	33*	125	(0%-30%)		
Dinoseb	43.0	TU	1.79	JT	4.62	ug/kg	59*	11*	(0%-30%)		
MCPA	4300	U	248		3280	ug/kg	10	76	(0%-30%)		
MCPP	4300	U	215		4390	ug/kg	10	102	(0%-30%)		

QC Summary

Workorder: **466068**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1830390											
**2,4-Dichlorophenylacetic acid	107	92.9		164	ug/kg		153*	(37%-149%)	LOF	12/13/18	19:15

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Herbicide

Surrogate Recovery Report

SDG Number: GEL466524

Matrix Type: SOLID

Sample ID	Client ID	DCAA 1 %REC #	DCAA 2 %REC #
1204180685	MB for batch 1831924	79	98
1204180686	LCS for batch 1831924	94	90
466524001	B3MMR2	85	92
1204180689	B3MMR2MS	109	91
1204180690	B3MMR2MSD	95	89

Surrogate	Acceptance Limits
DCAA = 2,4-Dichlorophenylacetic acid	(37%-149%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2018

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **466524**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1831925										
QC1204180686 LCS										
2,4,5-T	39.9			34.8	ug/kg		87	(60%-139%)	LOF	12/20/18 16:55
2,4,5-TP	39.9			37.2	ug/kg		93	(62%-140%)		
2,4-D	39.9			33.9	ug/kg		85	(55%-140%)		
2,4-DB	39.9			37.1	ug/kg		93	(51%-152%)		
Dalapon	399			183	ug/kg		46	(32%-110%)		
Dicamba	39.9			33.9	ug/kg		85	(53%-135%)		
Dichlorprop	39.9			32.3	ug/kg		81	(52%-136%)		
Dinoseb	39.9			22.0	ug/kg		55	(24%-104%)		
MCPA	3990			2880	ug/kg		72	(44%-142%)		
MCPP	3990			3010	ug/kg		75	(39%-138%)		
**2,4-Dichlorophenylacetic acid	99.7			89.7	ug/kg		90	(37%-149%)		
QC1204180685 MB										
2,4,5-T			U	1.65	ug/kg					12/20/18 16:35
2,4,5-TP			U	1.65	ug/kg					

QC Summary

Workorder: **466524**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB										
Batch 1831925										
2,4-D			U	1.65	ug/kg				LOF	12/20/18 16:35
2,4-DB			U	1.65	ug/kg					
Dalapon			U	34.8	ug/kg					
Dicamba			U	1.99	ug/kg					
Dichlorprop			U	2.25	ug/kg					
Dinoseb			U	1.65	ug/kg					
MCPA			U	229	ug/kg					
MCPP			U	199	ug/kg					
**2,4-Dichlorophenylacetic acid	99.5			78.6	ug/kg		79	(37%-149%)		
QC1204180689 466524001 MS										
2,4,5-T	39.9	U	1.65	38.3	ug/kg		96	(39%-144%)		12/20/18 22:30
2,4,5-TP	39.9	U	1.65	39.4	ug/kg		99	(40%-146%)		
2,4-D	39.9	U	1.65	35.4	ug/kg		89	(40%-149%)		
2,4-DB	39.9	U	1.65	46.3	ug/kg		116	(29%-160%)		
Dalapon	399	U	34.8	210	ug/kg		53	(19%-132%)		
Dicamba	39.9	U	1.99	38.9	ug/kg		98	(46%-135%)		

QC Summary

Workorder: **466524**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1831925											
Dichlorprop	39.9	U	2.25		37.8	ug/kg		95	(38%-145%)	LOF	12/20/18 22:30
Dinoseb	39.9	TU	1.65	JT	2.15	ug/kg		5*	(20%-118%)		
MCPA	3990	U	228		3430	ug/kg		86	(29%-154%)		
MCPP	3990	U	199		3370	ug/kg		85	(30%-135%)		
**2,4-Dichlorophenylacetic acid	99.7		84.3		109	ug/kg		109	(37%-149%)		
QC1204180690 466524001 MSD											
2,4,5-T	39.8	U	1.65		37.1	ug/kg	3	93	(0%-30%)		12/20/18 22:59
2,4,5-TP	39.8	U	1.65		39.4	ug/kg	0	99	(0%-30%)		
2,4-D	39.8	U	1.65		38.4	ug/kg	8	96	(0%-30%)		
2,4-DB	39.8	U	1.65		44.8	ug/kg	3	113	(0%-30%)		
Dalapon	398	U	34.8		257	ug/kg	20	64	(0%-30%)		
Dicamba	39.8	U	1.99		38.8	ug/kg	0	97	(0%-30%)		
Dichlorprop	39.8	U	2.25		36.1	ug/kg	5	91	(0%-30%)		
Dinoseb	39.8	TU	1.65	T	7.55	ug/kg	111*	19*	(0%-30%)		
MCPA	3980	U	228		3550	ug/kg	3	89	(0%-30%)		
MCPP	3980	U	199		3780	ug/kg	11	95	(0%-30%)		

QC Summary

Workorder: **466524**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1831925											
**2,4-Dichlorophenylacetic acid	99.5	84.3		94.6	ug/kg		95	(37%-149%)	LOF	12/20/18	22:59

Notes:

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- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

S740277-RPT-05
PNNL-28626

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