

April 19, 2016

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-16629-1

TestAmerica Sample Delivery Group: SL2144  
Client Project/Site: F16-020

For:

CH2M Hill Plateau Remediation Company  
PO BOX 1600, MS H8-41  
Richland, Washington 99352

Attn: Mr. Scot Fitzgerald



Authorized for release by:  
4/19/2016 5:10:35 PM

Jayna Awalt, Project Manager II  
(314)298-8566  
[jayna.awalt@testamericainc.com](mailto:jayna.awalt@testamericainc.com)

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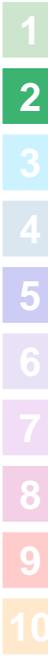
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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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Case Narrative

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Job ID: 160-16629-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

CH2M Hill Plateau Remediation Company  
P.O. Box 1600  
Richland, Washington 99352  
April 19, 2016  
Attention: Scot Fitzgerald

SDG : SL2144  
Number of Samples : 1 sample  
Sample Matrix : Soil  
Data Deliverable : Summary  
Date SDG Closed : March 22, 2016

II. Introduction

On March 22, 1 sample was received by TestAmerica - St. Louis for chemical analysis. **The samples were not received within temperature criteria. No ice was received in cooler. Per SIR16-264, analyses were performed and reported.** See the COC and receipt checklists for documentation of any variations on receipt conditions and temperature. Upon receipt, samples were given laboratory Ids to correspond with specific client Ids. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

The following SAFs are associated with this SDG: F16-020

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits. All results are based upon samples as they were received, i.e. wet weight, unless otherwise noted on the data sheets. See the attached Methods Summary Form for the methods used in this SDG.

MS/MSD/Dup analysis was done per the client requirements. Analytical batches that did not contain matrix QC were analyzed with an LCS/LCS duplicate.

Note: For Metals analyses, per standard practice, all 6020 water and soil samples are initially prepared at 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate flagging unless otherwise noted in the case narrative.

For solid matrices, all Metals analyses (including Hg) use a Standard Reference Material for the Laboratory Control Sample (LCS). Certificate for this source material may be obtained from TASL.

For Anion analysis, samples have been started at a 2x dilution per CHPRC direction. The samples are flagged accordingly with a "D" flag if sample concentration is above the MDL/RL. Non-conformance will be included in the below section only if dilution is greater than 2x.

For WTPH methods, the lab utilizes method 8015B. Per CHPRC direction, the method name in the electronic data has been modified to read WTPH in the place of 8015B.

Per CHPRC direction (June 2014), Boron will be reported for Metals using method 6010. Boron will no longer be reported by method 6020.

Per CHPRC direction, due to the short hold times for Nitrate, Nitrite and Phosphate by IC (48 hours) as well as pH analysis (24 hours), a SIR request is not needed when samples are run outside 1x hold but within 2x hold. A narrative comment will be included below if a sample is run outside the lab-specified hold time for waters.



## Case Narrative

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

### Job ID: 160-16629-1 (Continued)

#### Laboratory: TestAmerica St. Louis (Continued)

For extractable and volatile organic analyses, several analytes are considered poor performers and will not meet CHPRC QC limits. Per CHPRC direction, the lab's statistical limits have been reported. Excursions outside these statistical limits will include a non-conformance in the sections below.

#### IV. Definitions

QCBLK-	Quality Control Blank, Method Blank
QCLCS-	Quality Control Laboratory Control Sample, Blank Spike
DUP-	Laboratory Duplicate
MS-	Matrix Spike
MSD-	Matrix Spike Duplicate

The term "Detection Limit" used in the analytical data report refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

The following data qualifiers may be applicable to the results in this report, as appropriate.

- **B** - For inorganic analyses, the sample result is greater than the MDL but less than the RL.
- **B** - For organic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **J** - For organic analyses, the sample is estimated and less than the RL.
- **C** - For inorganic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **D** - For all analyses, the sample result was obtained from the analysis of a dilution. For Metals analyses, per standard practice, all solid samples are initially prepared at a 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate qualification unless otherwise noted in the case narrative.
- **N** - For inorganics and GC analyses, the spike/spike duplicate recoveries are outside QC limits.
- **T** - For GCMS analyses, the spike/spike duplicate recoveries are outside QC limits.
- **O** - For all analyses, the LCS (LCSD) recoveries are outside QC limits.
- **M** - For inorganic analyses, the precision was outside control limits.
- **P** - For organic analyses (PCB/Pests only), the aroclor target analyte has greater than 25% difference for detected concentrations between the two GC columns.

#### Anions

##### Batch: 243320

The sample and its duplicate had a %RPD that was outside the acceptance limit of 20% for Nitrite in analytical batch 160-243320. However, RPD is not useful for values near the reporting limit. As the sample and its duplicate had values less than 5x the reporting limit (RL) and are within +/- the RL of each other, the results are reported with this narrative.

#### ICPMS Metals

##### Batch: 242810

The following samples were diluted due to the nature of the sample matrix. The samples were high in salts, which cause internal standard and QC failures when the samples are run at a lesser dilution: B34T21 (160-16629-1), (160-16624-D-3-A), (160-16624-D-3-B MS), (160-16624-D-3-C MSD) and (160-16624-D-3-A SD). Elevated reporting limits (RLs) are provided. This analyte has been qualified accordingly with a "D" flag in the associated samples.

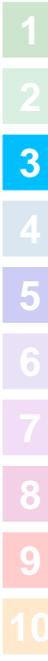
##### Batch: 242518

The following samples were diluted due to the nature of the sample matrix. The samples were high in salts, which cause internal standard and QC failures when the samples are run at a lesser dilution: B34T21 (160-16629-1), (160-16624-D-3-D), (160-16624-D-3-E

Case Narrative

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144



**Job ID: 160-16629-1 (Continued)**

**Laboratory: TestAmerica St. Louis (Continued)**

MS), (160-16624-D-3-F MSD) and (160-16624-D-3-D SD). Elevated reporting limits (RLs) are provided. These analytes have been qualified accordingly with a "D" flag in the associated samples.

The low level check (CCVL) was outside upper QC limits for aluminum. The concentration of this analyte in the samples was at such a high level as to make the CCVL unnecessary. (CCVL 160-242518/45)

Due to the high concentration of aluminum, the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 160-242007 and analytical batch 160-242518 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. (160-16624-D-3-E MS) and (160-16624-D-3-F MSD)

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 160-242007 and analytical batch 160-242518 were outside control limits for manganese. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. (160-16624-D-3-E MS) and (160-16624-D-3-F MSD) This analyte has been qualified accordingly with an "N" flag in the associated samples.

There were no observations or non-conformances associated with the following methods:

**Cyanide**

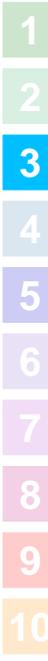
We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager or designee and the laboratory's client services representative as verified by their signature on this report.

Reviewed and approved:

Jayna Awalt  
St. Louis Project Manager

# SAMPLE ISSUE RESOLUTION

**SIR NUM** SIR16-264  
**REV NUM** 0  
**DATE INITIATED** 3/22/2016



## SAMPLE EVENT INFORMATION

**SAF NUM(S)** F16-020  
**OPERABLE UNIT(S)** 200-DV-1  
**PROJECT(S)** 200-DV-1  
**SAMPLE EVENT TITLE(S)** 200-DV-1 OU Waste Sites  
**LABORATORY** TestAmerica St. Louis

## SAMPLING INFORMATION

**NUMBER OF SAMPLES** 1  
**SAMPLE NUMBERS** B34T21  
**SAMPLE MATRIX**  
**COLLECTION DATE** -  
**SDG NUM** SL2144

## ISSUE BACKGROUND

**CLASS** Field Sampling Issue  
**TYPE** Incorrect Sample Preservation  
**DESCRIPTION** Sample was received at 19 degrees with no ice.

## DISPOSITION

**DESCRIPTION** TASL PROPOSES TO PROCEED WITH ANALYSES AND REPORT WITH NARRATIVE COMMENT  
OR  
CANCEL ANALYSES

**JUSTIFICATION** Final Disposition: Use option number one - proceed with analysis and report with narrative comment.

SUBMITTED BY: Jayna Awalt DATE: 03/22/2016  
ACCEPTED BY: Scot Fitzgerald DATE: 03/22/2016

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-16629-1

SDG Number: SL2144

Login Number: 16629

List Source: TestAmerica St. Louis

List Number: 1

Creator: McKinney, Gerrod E

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ 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.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	No ice- proceed per SIR16-264
Cooler Temperature is acceptable.	False	19° C - Proceed per SIR16-264
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.	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 $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		PAGE 1 OF 1	
COLLECTOR <i>SM Sexton</i>	8L2144	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H
SAMPLING LOCATION C9550, Core 2, B340T3		PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites Phase 3 Sampling		SAF NO. F16-020	AIR QUALITY <input type="checkbox"/>
ICE CHEST NO. #1		FIELD LOGBOOK NO. N/A	ACTUAL SAMPLE DEPTH 49.9-51.9	COA 302914	METHOD OF SHIPMENT FEDERAL EXPRESS
SHIPPED TO TestAmerica St. Louis		OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO.	

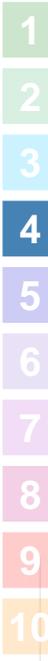
MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION		NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SPECIAL HANDLING AND/OR STORAGE
		Cool <=6C	None				
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	28 Days/48 Hours	6 Months	1	60mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	
		G/P	G/P	1	60mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	
							9012-CYANIDE: COMMON;
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				
B34T21	SOIL	3/18/16	1417				

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
<i>SM Sexton</i>	3/18/16/1535	<i>Bob J. Beck</i>	3-18-16/1535
<i>Bob J. Beck</i>	3-21-16/1400	<i>Brian Daniels</i>	3/22/16
<i>FED EX</i>		<i>Brian Daniels</i>	3/22/16 09:15

**SPECIAL INSTRUCTIONS**  
 Sample From HEIS #: *B 34T 3* Actual Aliquot Collection  
 Depth: *47.9-52.7 49.9-51.9*  
 (1) 300.0\_ANIONS\_IC: COMMON; 300.0\_ANIONS\_IC: COMMON (Add-on) {Phosphate};  
 (2) 6020\_METALS\_ICPMS: COMMON {Aluminum, Antimony, Barium, Cadmium, Chromium, Copper, Lead, Selenium, Silver};  
 6020\_METALS\_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium};

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 3/16/2016	FSR ID = FSR26363	TRVL NUM = TRVL-16-100	A-6003-618 (REV 2)





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**775925723587**

Ship date: <b>Mon 3/21/2016</b>	Actual delivery: <b>Tue 3/22/2016 9:10 am</b>
RICHLAND, WA US	<b>Delivered</b> <i>Signed for by: C.MCKINNEY</i>
	EARTH CITY, MO US

Travel History

Date/Time	Activity	Location
<b>- 3/22/2016 - Tuesday</b>		
9:10 am	Delivered	EARTH CITY, MO
7:01 am	On FedEx vehicle for delivery	EARTH CITY, MO
6:56 am	At local FedEx facility	EARTH CITY, MO
5:42 am	At destination sort facility	BERKELEY, MO
4:52 am	Departed FedEx location	MEMPHIS, TN
12:41 am	Arrived at FedEx location	MEMPHIS, TN
<b>- 3/21/2016 - Monday</b>		
4:59 pm	Left FedEx origin facility	PASCO, WA
4:13 pm	Shipment information sent to FedEx	
3:26 pm	Picked up	PASCO, WA

Shipment Facts

<b>Tracking number</b>	775925723587	<b>Service</b>	FedEx Priority Overnight
<b>Weight</b>	1 lbs / 0.45 kgs	<b>Delivered To</b>	Shipping/Receiving
<b>Total pieces</b>	1	<b>Total shipment weight</b>	1 lbs / 0.45 kgs
<b>Terms</b>	Recipient	<b>Shipper reference</b>	FLH
<b>Packaging</b>	Your Packaging	<b>Special handling section</b>	Deliver Weekday



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## Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company  
 Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
 SDG: SL2144

### Qualifiers

#### HPLC/IC

Qualifier	Qualifier Description
B	Estimated result. Result is less than the RL, but greater than MDL
U	Analyzed for but not detected.
M	Sample duplicate precision not met.

#### Metals

Qualifier	Qualifier Description
D	The reported value is from a dilution.
N	Recovery exceeds upper or lower control limits
B	Estimated result. Result is less than the RL, but greater than MDL
U	Analyzed for but not detected.

#### General Chemistry

Qualifier	Qualifier Description
U	Analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

# Method Summary

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SL
6020A	Metals (ICP/MS)	SW846	TAL SL
9012B	Cyanide, Total and/or Amenable	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL

**Protocol References:**

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



April 19, 2016

## Sample Summary

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16629-1	B34T21	Soil	03/18/16 14:17	03/22/16 09:15

---

1

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Client Sample Results

Client: CH2M Hill Plateau Remediation Company  
 Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
 SDG: SL2144

Method: 300.0 - Anions, Ion Chromatography

Client Sample ID: B34T21  
 Date Collected: 03/18/16 14:17  
 Date Received: 03/22/16 09:15

Lab Sample ID: 160-16629-1  
 Matrix: Soil  
 Percent Solids: 98.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.20	B	1.0	0.15	mg/Kg	☼	03/31/16 15:00	04/01/16 21:30	1
Nitrate as N	1.4		0.20	0.055	mg/Kg	☼	03/31/16 15:00	04/01/16 21:30	1
Nitrite as N	0.066	B	0.20	0.056	mg/Kg	☼	03/31/16 15:00	04/01/16 21:30	1
Sulfate	7.8		5.1	0.51	mg/Kg	☼	03/31/16 15:00	04/01/16 21:30	1
Chloride	2.4		2.0	0.20	mg/Kg	☼	03/31/16 15:00	04/01/16 21:30	1
Phosphate	0.58	U	5.1	0.58	mg/Kg	☼	04/07/16 16:00	04/07/16 22:26	1

Method: 6020A - Metals (ICP/MS)

Client Sample ID: B34T21  
 Date Collected: 03/18/16 14:17  
 Date Received: 03/22/16 09:15

Lab Sample ID: 160-16629-1  
 Matrix: Soil  
 Percent Solids: 98.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9040	D	24.6	8.2	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Antimony	0.58	U	4.5	0.58	mg/Kg	☼	03/28/16 08:40	03/30/16 06:02	20
Arsenic	2.9	B D	4.9	1.3	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Barium	51.5	D	9.9	0.46	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Cadmium	0.085	B D	0.25	0.079	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Chromium	16.4	D	4.9	2.2	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Copper	14.9	D	4.9	0.50	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Lead	5.6	D	1.5	0.49	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Manganese	381	N D	2.5	0.38	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Nickel	16.5	D	2.5	0.53	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Selenium	0.88	B D	2.5	0.78	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Silver	0.12	U	0.99	0.12	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10
Uranium	0.75	D	0.49	0.098	mg/Kg	☼	03/24/16 09:40	03/29/16 03:32	10

General Chemistry

Client Sample ID: B34T21  
 Date Collected: 03/18/16 14:17  
 Date Received: 03/22/16 09:15

Lab Sample ID: 160-16629-1  
 Matrix: Soil  
 Percent Solids: 98.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.11	U	0.51	0.11	mg/Kg	☼	03/22/16 19:25	03/22/16 22:34	1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 160-242501/1-A  
Matrix: Solid  
Analysis Batch: 243320

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 242501

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.14	U	1.0	0.14	mg/Kg		03/31/16 15:00	04/01/16 19:35	1
Nitrate as N	0.055	U	0.20	0.055	mg/Kg		03/31/16 15:00	04/01/16 19:35	1
Nitrite as N	0.055	U	0.20	0.055	mg/Kg		03/31/16 15:00	04/01/16 19:35	1
Sulfate	0.50	U	5.0	0.50	mg/Kg		03/31/16 15:00	04/01/16 19:35	1
Chloride	0.20	U	2.0	0.20	mg/Kg		03/31/16 15:00	04/01/16 19:35	1

Lab Sample ID: LCS 160-242501/2-A  
Matrix: Solid  
Analysis Batch: 243320

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 242501

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Fluoride	9.96	9.18		mg/Kg		92	90 - 110
Nitrate as N	3.98	3.77		mg/Kg		95	90 - 110
Nitrite as N	1.59	1.49		mg/Kg		93	90 - 110
Sulfate	79.7	71.4		mg/Kg		90	90 - 110
Chloride	19.9	18.4		mg/Kg		92	90 - 110

Lab Sample ID: 160-16655-A-1-C MS  
Matrix: Solid  
Analysis Batch: 243320

Client Sample ID: Matrix Spike  
Prep Type: Total/NA  
Prep Batch: 242501

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Fluoride	0.76	B	20.6	23.0		mg/Kg	☼	108	90 - 110
Nitrate as N	3.4		4.12	7.84		mg/Kg	☼	108	90 - 110
Nitrite as N	0.075	B M	1.03	1.08		mg/Kg	☼	97	90 - 110
Sulfate	15		41.2	57.2		mg/Kg	☼	101	90 - 110
Chloride	3.8		20.6	24.6		mg/Kg	☼	101	90 - 110

Lab Sample ID: 160-16655-A-1-B DU  
Matrix: Solid  
Analysis Batch: 243320

Client Sample ID: Duplicate  
Prep Type: Total/NA  
Prep Batch: 242501

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Fluoride	0.76	B	0.755	B	mg/Kg	☼	0.5	20
Nitrate as N	3.4		3.63		mg/Kg	☼	7	20
Nitrite as N	0.075	B M	0.132	B M	mg/Kg	☼	55	20
Sulfate	15		15.7		mg/Kg	☼	2	20
Chloride	3.8		3.54		mg/Kg	☼	7	20

Lab Sample ID: MB 160-244966/1-A  
Matrix: Solid  
Analysis Batch: 244930

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 244966

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphate	0.56	U	5.0	0.56	mg/Kg		04/07/16 16:00	04/07/16 20:38	1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 160-244966/2-A  
Matrix: Solid  
Analysis Batch: 244930

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 244966

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Phosphate	80.3	76.2		mg/Kg		95	90 - 110

Lab Sample ID: 160-16655-A-1-I MS  
Matrix: Solid  
Analysis Batch: 244930

Client Sample ID: Matrix Spike  
Prep Type: Total/NA  
Prep Batch: 244966

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Phosphate	0.58	U	41.5	42.5		mg/Kg	☼	102	90 - 110

Lab Sample ID: 160-16655-A-1-H DU  
Matrix: Solid  
Analysis Batch: 244930

Client Sample ID: Duplicate  
Prep Type: Total/NA  
Prep Batch: 244966

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Phosphate	0.58	U	0.58	U	mg/Kg	☼	NC	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 160-242005/1-A  
Matrix: Solid  
Analysis Batch: 242810

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 242005

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.062	U	0.48	0.062	mg/Kg		03/28/16 08:40	03/30/16 04:47	2

Lab Sample ID: LCSSRM 160-242005/2-A  
Matrix: Solid  
Analysis Batch: 242810

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 242005

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	Limits
Antimony	88.8	157.4		mg/Kg		177.3	22.0 - 259.0

Lab Sample ID: 160-16624-D-3-B MS  
Matrix: Solid  
Analysis Batch: 242810

Client Sample ID: Matrix Spike  
Prep Type: Total/NA  
Prep Batch: 242005

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	0.65	U	48.3	48.63	D	mg/Kg	☼	101	75 - 125

Lab Sample ID: 160-16624-D-3-C MSD  
Matrix: Solid  
Analysis Batch: 242810

Client Sample ID: Matrix Spike Duplicate  
Prep Type: Total/NA  
Prep Batch: 242005

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.65	U	47.1	45.45	D	mg/Kg	☼	97	75 - 125	7	30

QC Sample Results

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 160-242007/1-A  
Matrix: Solid  
Analysis Batch: 242518

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 242007

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.5	U	4.6	1.5	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Arsenic	0.24	U	0.91	0.24	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Barium	0.086	U	1.8	0.086	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Cadmium	0.015	U	0.046	0.015	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Chromium	0.41	U	0.91	0.41	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Copper	0.092	U	0.91	0.092	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Lead	0.091	U	0.27	0.091	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Manganese	0.070	U	0.46	0.070	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Nickel	0.097	U	0.46	0.097	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Selenium	0.14	U	0.46	0.14	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Silver	0.022	U	0.18	0.022	mg/Kg		03/24/16 09:40	03/29/16 02:11	2
Uranium	0.018	U	0.091	0.018	mg/Kg		03/24/16 09:40	03/29/16 02:11	2

Lab Sample ID: LCS 160-242007/2-A  
Matrix: Solid  
Analysis Batch: 242518

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 242007

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Uranium	89.9	89.12		mg/Kg		99	80 - 120

Lab Sample ID: LCSSRM 160-242007/3-A  
Matrix: Solid  
Analysis Batch: 242518

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 242007

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	Limits
Aluminum	7460	6294		mg/Kg		84.4	37.3 - 162. 2
Arsenic	139	146.5		mg/Kg		105.4	70.4 - 140. 3
Barium	203	195.7		mg/Kg		96.4	73.4 - 127. 1
Cadmium	96.0	96.18		mg/Kg		100.2	73.2 - 127. 1
Chromium	136	134.9		mg/Kg		99.2	69.9 - 129. 4
Copper	168	178.0		mg/Kg		106.0	75.6 - 125. 0
Lead	133	127.7		mg/Kg		96.0	72.9 - 127. 8
Manganese	297	300.7		mg/Kg		101.3	74.4 - 125. 6
Nickel	123	132.3		mg/Kg		107.5	73.1 - 128. 5
Selenium	177	192.7		mg/Kg		108.9	67.8 - 131. 6
Silver	40.2	40.74		mg/Kg		101.4	66.2 - 134. 1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company  
Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
SDG: SL2144

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 160-16624-D-3-E MS  
Matrix: Solid  
Analysis Batch: 242518

Client Sample ID: Matrix Spike  
Prep Type: Total/NA  
Prep Batch: 242007  
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Aluminum	5830	D	1000	9181	D	mg/Kg	☼	335	75 - 125
Arsenic	5.8	D	100	109.0	D	mg/Kg	☼	103	75 - 125
Barium	72.3	D	100	175.7	D	mg/Kg	☼	103	75 - 125
Cadmium	0.20	B D	100	98.59	D	mg/Kg	☼	98	75 - 125
Chromium	6.7	D	100	105.2	D	mg/Kg	☼	98	75 - 125
Copper	15.6	D	100	117.5	D	mg/Kg	☼	102	75 - 125
Lead	5.4	D	100	101.8	D	mg/Kg	☼	96	75 - 125
Manganese	376	N D	100	547.6	D N	mg/Kg	☼	171	75 - 125
Nickel	8.9	D	100	114.4	D	mg/Kg	☼	105	75 - 125
Selenium	0.77	U	50.1	50.95	D	mg/Kg	☼	102	75 - 125
Silver	0.20	B D	20.0	19.78	D	mg/Kg	☼	98	75 - 125
Uranium	0.64	D	100	95.14	D	mg/Kg	☼	94	75 - 125

Lab Sample ID: 160-16624-D-3-F MSD  
Matrix: Solid  
Analysis Batch: 242518

Client Sample ID: Matrix Spike Duplicate  
Prep Type: Total/NA  
Prep Batch: 242007  
%Rec. RPD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	5830	D	977	9177	D	mg/Kg	☼	343	75 - 125	0	30
Arsenic	5.8	D	97.7	107.3	D	mg/Kg	☼	104	75 - 125	2	30
Barium	72.3	D	97.7	175.2	D	mg/Kg	☼	105	75 - 125	0	30
Cadmium	0.20	B D	97.6	97.39	D	mg/Kg	☼	100	75 - 125	1	30
Chromium	6.7	D	97.7	106.2	D	mg/Kg	☼	102	75 - 125	1	30
Copper	15.6	D	97.7	116.7	D	mg/Kg	☼	104	75 - 125	1	30
Lead	5.4	D	97.7	100.8	D	mg/Kg	☼	98	75 - 125	1	30
Manganese	376	N D	97.7	556.1	N D	mg/Kg	☼	184	75 - 125	2	30
Nickel	8.9	D	97.7	112.8	D	mg/Kg	☼	106	75 - 125	1	30
Selenium	0.77	U	48.8	52.50	D	mg/Kg	☼	107	75 - 125	3	30
Silver	0.20	B D	19.5	19.68	D	mg/Kg	☼	100	75 - 125	1	30
Uranium	0.64	D	97.7	94.48	D	mg/Kg	☼	96	75 - 125	1	30

Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 160-241618/1-A  
Matrix: Solid  
Analysis Batch: 241827

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 241618

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.11	U	0.50	0.11	mg/Kg		03/22/16 19:25	03/22/16 21:40	1

Lab Sample ID: HLCS 160-241618/3-A  
Matrix: Solid  
Analysis Batch: 241827

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 241618  
%Rec.

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	Limits
Cyanide, Total	4.80	4.76		mg/Kg		99	85 - 115

QC Sample Results

Client: CH2M Hill Plateau Remediation Company  
 Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
 SDG: SL2144

Method: 9012B - Cyanide, Total and/or Amenable (Continued)

Lab Sample ID: LCS 160-241618/2-A  
 Matrix: Solid  
 Analysis Batch: 241827

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 241618

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cyanide, Total	2.40	2.36		mg/Kg		98	85 - 115

Lab Sample ID: 160-16474-A-3-F MS  
 Matrix: Solid  
 Analysis Batch: 241827

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA  
 Prep Batch: 241618

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cyanide, Total	0.12	U	2.55	2.43		mg/Kg	☼	95	60 - 130

Lab Sample ID: 160-16474-A-3-E DU  
 Matrix: Solid  
 Analysis Batch: 241827

Client Sample ID: Duplicate  
 Prep Type: Total/NA  
 Prep Batch: 241618

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Cyanide, Total	0.12	U	0.12	U	mg/Kg	☼	NC	30

QC Association Summary

Client: CH2M Hill Plateau Remediation Company  
 Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
 SDG: SL2144

HPLC/IC

Prep Batch: 242501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16629-1	B34T21	Total/NA	Soil	DILeach_Prep	
160-16655-A-1-B DU	Duplicate	Total/NA	Solid	DILeach_Prep	
160-16655-A-1-C MS	Matrix Spike	Total/NA	Solid	DILeach_Prep	
LCS 160-242501/2-A	Lab Control Sample	Total/NA	Solid	DILeach_Prep	
MB 160-242501/1-A	Method Blank	Total/NA	Solid	DILeach_Prep	

Analysis Batch: 243320

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16629-1	B34T21	Total/NA	Soil	300.0	242501
160-16655-A-1-B DU	Duplicate	Total/NA	Solid	300.0	242501
160-16655-A-1-C MS	Matrix Spike	Total/NA	Solid	300.0	242501
LCS 160-242501/2-A	Lab Control Sample	Total/NA	Solid	300.0	242501
MB 160-242501/1-A	Method Blank	Total/NA	Solid	300.0	242501

Analysis Batch: 243321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16629-1	B34T21	Total/NA	Soil	300.0	242501
160-16655-A-1-B DU	Duplicate	Total/NA	Solid	300.0	242501
160-16655-A-1-C MS	Matrix Spike	Total/NA	Solid	300.0	242501
LCS 160-242501/2-A	Lab Control Sample	Total/NA	Solid	300.0	242501
MB 160-242501/1-A	Method Blank	Total/NA	Solid	300.0	242501

Analysis Batch: 244930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16629-1	B34T21	Total/NA	Soil	300.0	244966
160-16655-A-1-H DU	Duplicate	Total/NA	Solid	300.0	244966
160-16655-A-1-I MS	Matrix Spike	Total/NA	Solid	300.0	244966
LCS 160-244966/2-A	Lab Control Sample	Total/NA	Solid	300.0	244966
MB 160-244966/1-A	Method Blank	Total/NA	Solid	300.0	244966

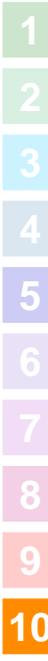
Prep Batch: 244966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16629-1	B34T21	Total/NA	Soil	DILeach_Prep	
160-16655-A-1-H DU	Duplicate	Total/NA	Solid	DILeach_Prep	
160-16655-A-1-I MS	Matrix Spike	Total/NA	Solid	DILeach_Prep	
LCS 160-244966/2-A	Lab Control Sample	Total/NA	Solid	DILeach_Prep	
MB 160-244966/1-A	Method Blank	Total/NA	Solid	DILeach_Prep	

Metals

Prep Batch: 242005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16624-D-3-B MS	Matrix Spike	Total/NA	Solid	3050B	
160-16624-D-3-C MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	
160-16629-1	B34T21	Total/NA	Soil	3050B	
LCSSRM 160-242005/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-242005/1-A	Method Blank	Total/NA	Solid	3050B	



QC Association Summary

Client: CH2M Hill Plateau Remediation Company  
 Project/Site: F16-020

TestAmerica Job ID: 160-16629-1  
 SDG: SL2144

Metals (Continued)

Prep Batch: 242007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16624-D-3-E MS	Matrix Spike	Total/NA	Solid	3050B	
160-16624-D-3-F MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	
160-16629-1	B34T21	Total/NA	Soil	3050B	
LCS 160-242007/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSSRM 160-242007/3-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-242007/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 242518

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16624-D-3-E MS	Matrix Spike	Total/NA	Solid	6020A	242007
160-16624-D-3-F MSD	Matrix Spike Duplicate	Total/NA	Solid	6020A	242007
160-16629-1	B34T21	Total/NA	Soil	6020A	242007
LCS 160-242007/2-A	Lab Control Sample	Total/NA	Solid	6020A	242007
LCSSRM 160-242007/3-A	Lab Control Sample	Total/NA	Solid	6020A	242007
MB 160-242007/1-A	Method Blank	Total/NA	Solid	6020A	242007

Analysis Batch: 242810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16624-D-3-B MS	Matrix Spike	Total/NA	Solid	6020A	242005
160-16624-D-3-C MSD	Matrix Spike Duplicate	Total/NA	Solid	6020A	242005
160-16629-1	B34T21	Total/NA	Soil	6020A	242005
LCSSRM 160-242005/2-A	Lab Control Sample	Total/NA	Solid	6020A	242005
MB 160-242005/1-A	Method Blank	Total/NA	Solid	6020A	242005

General Chemistry

Prep Batch: 241618

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16474-A-3-E DU	Duplicate	Total/NA	Solid	9010C	
160-16474-A-3-F MS	Matrix Spike	Total/NA	Solid	9010C	
160-16629-1	B34T21	Total/NA	Soil	9010C	
HLCS 160-241618/3-A	Lab Control Sample	Total/NA	Solid	9010C	
LCS 160-241618/2-A	Lab Control Sample	Total/NA	Solid	9010C	
MB 160-241618/1-A	Method Blank	Total/NA	Solid	9010C	

Analysis Batch: 241628

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16624-B-3 DU	Duplicate	Total/NA	Solid	Moisture	
160-16629-1	B34T21	Total/NA	Soil	Moisture	

Analysis Batch: 241827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16474-A-3-E DU	Duplicate	Total/NA	Solid	9012B	241618
160-16474-A-3-F MS	Matrix Spike	Total/NA	Solid	9012B	241618
160-16629-1	B34T21	Total/NA	Soil	9012B	241618
HLCS 160-241618/3-A	Lab Control Sample	Total/NA	Solid	9012B	241618
LCS 160-241618/2-A	Lab Control Sample	Total/NA	Solid	9012B	241618
MB 160-241618/1-A	Method Blank	Total/NA	Solid	9012B	241618