WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-DR-1 **Control No.:** 2015-023

Waste Site Code(s)/Subsite Code(s): 100-D-75:1

Reclassification Category: Interim ☒ Final ☐

Reclassification Status: Closed Out ☒ No Action ☐ Rejected ☐
RCRA Postclosure ☐ Consolidated ☐ None ☐

Approvals Needed: DOE ☒ Ecology ☒ EPA ☐

Description of current waste site condition:

The 100-D-75:1, 151-D Primary Electrical Substation subsite, part of the 100-DR-1 Operable Unit, consisted of a fenced gravel-bed yard, the 151-D Switch House, a railroad spur entering the yard from the east, and concrete pads used to support a variety of electrical equipment. The site was included in the *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington* (Remaining Sites ESD), U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 2009), as a candidate site for confirmatory sampling. Subsequently, the 100-D-75:1 subsite was identified for remove, treat, and dispose (RTD) when residual oil-stained areas were discovered during demolition of the substation.

Remediation of the 100-D-75:1 subsite was performed between July 7 and October 28, 2014. Approximately 17,039 bank cubic meters (22,286 bank cubic yards) of excavated materials were removed and staged for disposal at the Environmental Restoration Disposal Facility. Remediation, verification sampling, and comparison of residual contaminant concentrations against cleanup levels have been performed in accordance with remedial action objectives (RAOs) and remedial action goals (RAGs) established by the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD), U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 1999). The selected remedy involved (1) excavating the subsite to the extent required to meet specified soil cleanup levels, (2) disposing of contaminated excavation materials at the Environmental Restoration Disposal Facility at the 200 Area of the Hanford Site, (3) demonstrating through verification sampling that cleanup goals have been achieved, and (4) proposing the subsite for reclassification as Interim Closed Out.

Basis for reclassification:

Cleanup verification sampling results were evaluated in comparison to the RAGs. In accordance with this evaluation, the verification sampling results support a reclassification of this subsite to Interim Closed Out. The current site conditions achieve the RAOs and corresponding RAGs established in the Remaining Sites ROD (EPA 1999). The evaluation (which may include fate-and-transport modeling) of all verification sample data collected from the 100-D-75:1 subsite resulted in a determination that residual contaminant concentrations do not preclude any future uses (as bounded by the rural-residential scenario) and allow for unrestricted use of shallow zone soils (i.e., surface to 4.6 m [15 ft] deep). The results also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-D-75:1, 151-D Primary Electrical Substation Subsite* (attached). Site contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in the deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-DR-1 **Control No.:** 2015-023

Waste Site Code(s)/Subsite Code(s): 100-D-75:1

Regulator comments:

Waste Site Controls:

Engineered Controls: ☐ Yes ☒ No Institutional Controls: ☐ Yes ☒ No O&M Requirements: ☐ Yes ☒ No

If any of the Waste Site Controls are checked Yes, specify control requirements including reference to the Record of Decision, TSD Closure Letter, or other relevant documents:

J. P. Neath	J P Neath	6/16/15
DOE Federal Project Director (printed)	Signature	Date
N. Menard	Nina M. Menard	6/17/15
Ecology Project Manager (printed)	Signature	Date
N/A		
EPA Project Manager (printed)	Signature	Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-75:1, 151-D PRIMARY ELECTRICAL SUBSTATION SUBSITE

Attachment to Waste Site Reclassification Form 2015-023

July 2015

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-75:1, 151-D PRIMARY ELECTRICAL SUBSTATION SUBSITE

EXECUTIVE SUMMARY

The 100-D-75:1, 151-D Primary Electrical Substation subsite, part of the 100-DR-1 Operable Unit, consisted of a fenced gravel-bed yard, a railroad spur, and concrete pads of various sizes that supported a variety of electrical equipment. The site was included in the *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington* (Remaining Sites ESD) (EPA 2009) as a candidate site for confirmatory sampling. Subsequently, the 100-D-75:1 subsite was identified for remove, treat, and dispose (RTD) when residual oil-stained areas were discovered during demolition of the substation (WCH 2014a). The 100-D-75:1 subsite is located approximately 142 m (466 ft) northwest of the 105-DR Reactor Building.

Remediation of the 100-D-75:1 subsite was performed between July 7 and October 28, 2014. Approximately 17,039 bank cubic meters (22,286 bank cubic yards) of excavated materials were removed and staged for disposal at Environmental Restoration Disposal Facility (ERDF). The excavated materials were stockpiled east of the excavation in the approved staging pile area. The staged materials were loaded out on August 14, 2014. Materials excavated from the waste site after this date were direct loaded for disposal at ERDF. No overburden material was associated with this subsite.

Verification sampling was conducted at the 100-D-75:1 subsite on February 2, 2015, per the *Work Instruction for Verification Sampling of the 100-D-75:1, 151-D Primary Electrical Substation Subsite* (WCH 2015b). The results indicate that the waste removal action achieved compliance with the remedial action objectives (RAOs) and remedial action goals (RAGs) of the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units* (Remaining Sites ROD) (EPA 1999). A summary of the cleanup evaluation for the soil results against the applicable criteria is presented in Table ES-1.

The results of the verification sampling are used to make reclassification decisions for the 100-D-75:1 subsite in accordance with the TPA-MP-14 procedure in the *Tri-Party Agreement Handbook Management Procedures* (DOE-RL 2011).

Table ES-1. Summary of Remedial Action Goals for the 100-D-75:1 Subsite. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain a dose rate of <15 mrem/yr above background for 1,000 years.	Radionuclides were not COPCs for the 100-D-75:1 subsite.	NA
Direct Exposure – Nonradionuclides	Attain individual direct exposure COPC RAGs.	All individual COPC concentrations are below the direct exposure criteria.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of <1 for all individual noncarcinogens.	The hazard quotients for individual nonradionuclide COPCs are <1.	Yes
	Attain a cumulative hazard quotient of <1 for noncarcinogens.	The cumulative hazard quotient for all sampling areas (1.9×10^{-4}) is <1.	
	Attain an excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	The excess cancer risk for aroclor-1260, the only constituent subject to the cancer risk calculation, is 9.2×10^{-8}, which is $<1 \times 10^{-6}$.	
	Attain a cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	The cancer risk for aroclor-1260, the only constituent subject to the cancer risk calculation, is 9.2×10^{-8}, which is $<1 \times 10^{-5}$.	
Groundwater/River Protection – Radionuclides	Attain single-COPC groundwater and river protection RAGs.	Radionuclides were not COPCs for the 100-D-75:1 subsite.	NA
	Attain national primary drinking water standards [a]: 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.		
	Meet drinking water standards for alpha emitters: the most stringent of 15 pCi/L MCL or 1/25th of the derived concentration guides from DOE Order 5400.5 [b].		
	Meet total uranium standard of 30 µg/L (21.2 pCi/L) [c].		

Table ES-1. Summary of Remedial Action Goals for the 100-D-75:1 Subsite. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Groundwater/River Protection – Nonradionuclides	Attain individual nonradionuclide groundwater and river cleanup requirements.	Residual concentrations of aroclor-1260 within the site excavation area are above the soil RAGs for groundwater and/or river protection. However, RESRAD modeling predicts that aroclor-1260 will not reach groundwater (and, therefore, the Columbia River) within 1,000 years [d].	Yes

[a] "National Primary Drinking Water Regulations" (40 *Code of Federal Regulations* 141).
[b] *Radiation Protection of the Public and the Environment* (DOE Order 5400.5).
[c] Based on the isotopic distribution of uranium in the 100 Area, the 30 µg/L MCL corresponds to 21.2 pCi/L. Concentration-to-activity calculations are documented in *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater* (BHI 2001).
[d] Based on RESRAD modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b), the residual concentrations of aroclor-1260 are not predicted to migrate vertically within 1,000 years (based on the distribution coefficient [K_d] of 822 mL/g for aroclor-1260). A contaminant with a K_d of 80 mL/g or greater is not predicted to migrate vertically through the soil. The distance to groundwater from the bottom of the excavation area is 21 m (69 ft). Therefore, residual concentrations of aroclor-1260 are predicted to be protective of groundwater and the Columbia River.

COPC = contaminant of potential concern
MCL = maximum contaminant level
RAG = remedial action goal
RDR/RAWP = remedial design report/remedial action work plan
RESRAD = RESidual RADioactivity (dose model)

In accordance with this evaluation, the verification sampling results support a reclassification of this subsite to Interim Closed Out. The current site conditions achieve the RAOs and the corresponding RAGs established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2009b) and the Remaining Sites ROD (EPA 1999). The results of verification sampling show that residual contaminant concentrations do not preclude any future uses (as bounded by the rural-residential scenario) and allow for unrestricted use of shallow zone soils (i.e., surface to 4.6 m [15 ft] deep). The results also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. Site contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in the deep zone soils (i.e., below 4.6 m [15 ft]); therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based on a limited ecological risk assessment. Although not required by the ROD, a comparison against ecological risk screening levels has been made for the site contaminants of potential concern and other constituents. Those constituents exceeding the ecological screening level in the *Washington Administrative Code* Chapter 173-340, Table 749-3 were boron and vanadium. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for antimony, manganese, vanadium, and zinc. Exceeding screening values does not necessarily indicate the existence of risk to ecological receptors. Because concentrations of antimony, manganese, vanadium, and zinc are below background levels, it is believed that the presence of

these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for ecological effects as a part of the final closeout decision for the Columbia River corridor portion of the Hanford Site. A table showing contaminant concentrations from the 100-D-75:1 subsite that exceed ecological screening levels is provided in Appendix A.

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-75:1, 151-D PRIMARY ELECTRICAL SUBSTATION SUBSITE

STATEMENT OF PROTECTIVENESS

The 100-D-75, 151-D Primary Electrical Substation subsite verification sampling data, site evaluations, and supporting documentation demonstrate that this site meets the objectives established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2009b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) (EPA 1999). These results show that residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario. The results also demonstrate that residual contaminant concentrations support unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. Site contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in the deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

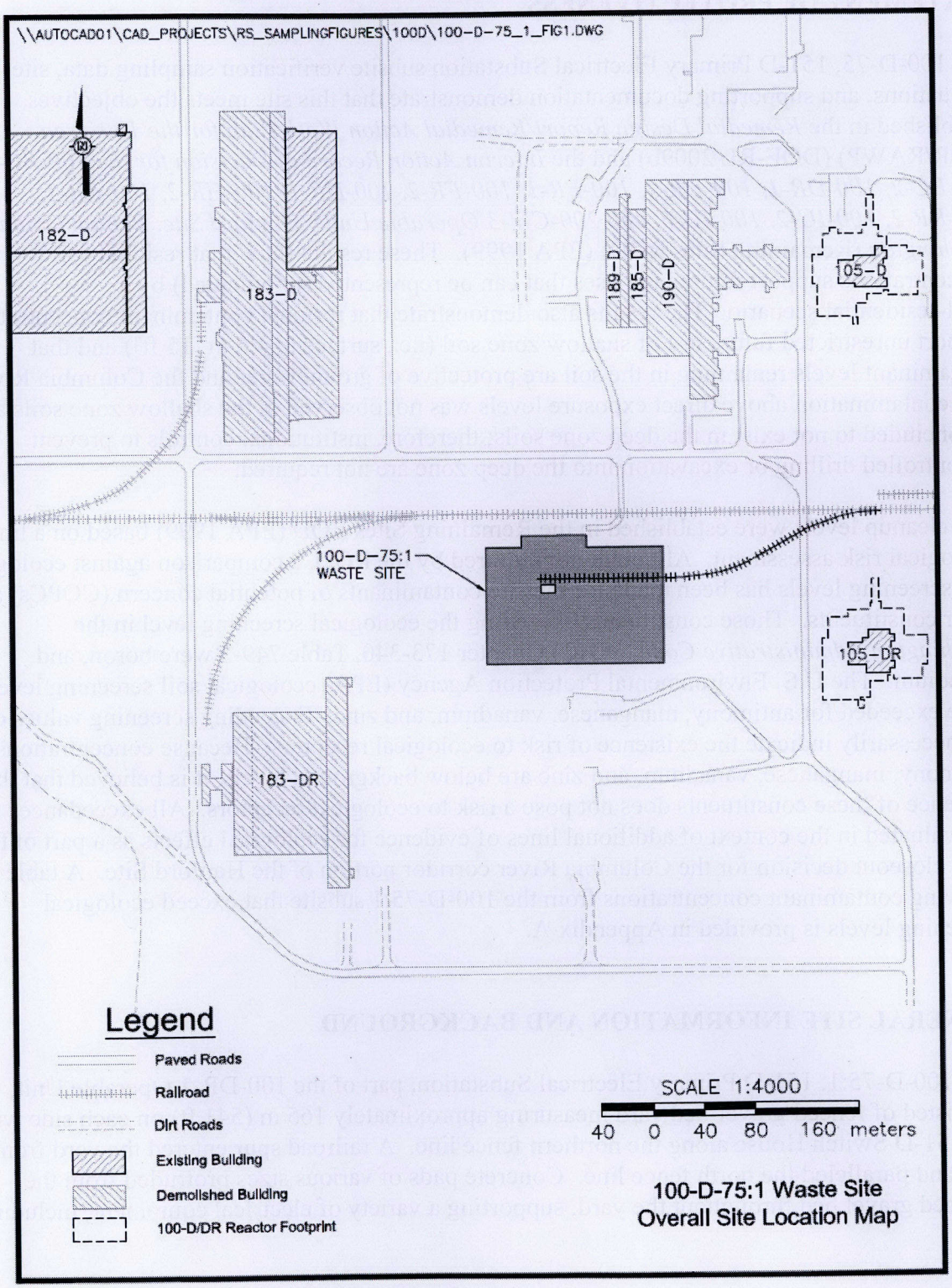
Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based on a limited ecological risk assessment. Although not required by the ROD, a comparison against ecological risk screening levels has been made for the site contaminants of potential concern (COPCs) and other constituents. Those constituents exceeding the ecological screening level in the *Washington Administrative Code* (WAC) Chapter 173-340, Table 749-3 were boron, and vanadium. The U.S. Environmental Protection Agency (EPA) ecological soil screening levels were exceeded for antimony, manganese, vanadium, and zinc. Exceeding screening values does not necessarily indicate the existence of risk to ecological receptors. Because concentrations of antimony, manganese, vanadium, and zinc are below background levels, it is believed that the presence of these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for ecological effects as a part of the final closeout decision for the Columbia River corridor portion of the Hanford Site. A table showing contaminant concentrations from the 100-D-75:1 subsite that exceed ecological screening levels is provided in Appendix A.

GENERAL SITE INFORMATION AND BACKGROUND

The 100-D-75:1, 151-D Primary Electrical Substation, part of the 100-DR-1 Operable Unit, consisted of fenced gravel-bed yard measuring approximately 165 m (541 ft) on each side with the 151-D Switch House along the northern fence line. A railroad spur entered the yard from the east and paralleled the north fence line. Concrete pads of various sizes protruded from the crushed gravel bed throughout the yard, supporting a variety of electrical equipment, including

transformers, circuit breakers, and power line towers and stands. The 100-D-75:1 subsite is located approximately 142 m (466 ft) northwest of the 105-DR Reactor Building (Figure 1).

Figure 1. Location of the 100-D-75:1 Subsite.



The 151-D Primary Electrical Substation was energized in 1944 and supplied electrical power to the 100-D/100-DR Area via secondary and distribution substations. The 151-D substation had live 230-KV power lines routed across the 151-D switchyard until the beginning of 2013 when the power lines were rerouted and the demolition of the 151-D Switch House was performed. The 151-D Primary Electrical Substation consisted of a fenced gravel-bed yard measuring approximately 165 m (541 ft) on each side with the 151-D Switch House along the northern fence line. All duct lines originated/terminated at the switch house. Switchgear was located on the main floor of the switch house, directly above a cable pit. The cable pit was a completely enclosed reinforced concrete pit with floor slab, varying from 0.3 to 0.4 m (1 to 1.5 ft) in thickness and with 0.3-m (1-ft)-thick walls. Concrete pads of various sizes protruded from the crushed gravel bed throughout the yard and were used to support a variety of electrical equipment including transformers, circuit breakers, and power line towers and stands. The concrete pads were a minimum of 0.9 m (3 ft) thick, with the top 15 cm (6 in.) above grade. The concrete pads varied from 0.61 to 2.1 m (2 to 7 ft) wide and from 0.9 to 6.4 m (3 to 21 ft) long.

Beneath the switchyard and throughout the 100-D/100-DR Area there was an extensive subsurface array of electrical conduits that contained lead and/or asbestos-wrapped cable inside Korduct® lining, all of which are surrounded by reinforced concrete. Korduct is a transite-like material. These concrete monoliths were as large as 1.8 m wide by 1.8 m deep (6 ft wide by 6 ft deep) and up to 152 m (500 ft) long per segment and were buried 0.9 to 1.5 m (3 to 5 ft) below the surface.

A railroad spur entered the switchyard from the east and paralleled the north fence line, north of the 151-D substation transformers. Oil for the transformers was brought into the switchyard via this spur in rail cars. The polychlorinated biphenyl (PCB)-bearing oil was transferred as needed in above-ground lines and through over-ground hoses from the rail cars to electrical equipment including transformers and circuit breakers in the yard. The smaller transformers at the secondary and distribution substations were also filled via over-ground hoses from oil trucks.

During the early years of operation, leaks and spills of PCBs from the electrical transformers, circuit breakers, and transfer systems went unreported at the electrical substations. There is a high probability that any leaks or spills that may have occurred would have been confined to the footprint of the over-ground transfer system, transformer pads and surrounding soil, oil circuit breaker pads and surrounding soil, and the railroad spur. The only known significant reported release of transformer oil was in 1995 in the 151-D switchyard. The release occurred at the #A401C transformer. The unplanned release site was issued waste site code 100-D-27 and has since been reclassified in the Waste Information Data System as Closed Out.

An analogous site, the 151-H Primary Substation (100-H-24), was remediated in 2000 by removing and disposing of approximately 20,000 metric tons of PCB-contaminated material.

A geophysical survey was performed in April 2012 and May 2013 to support excavation of the subsite (Figure 2). Linear anomalies detected with a utility detector were identified as inactive utilities.

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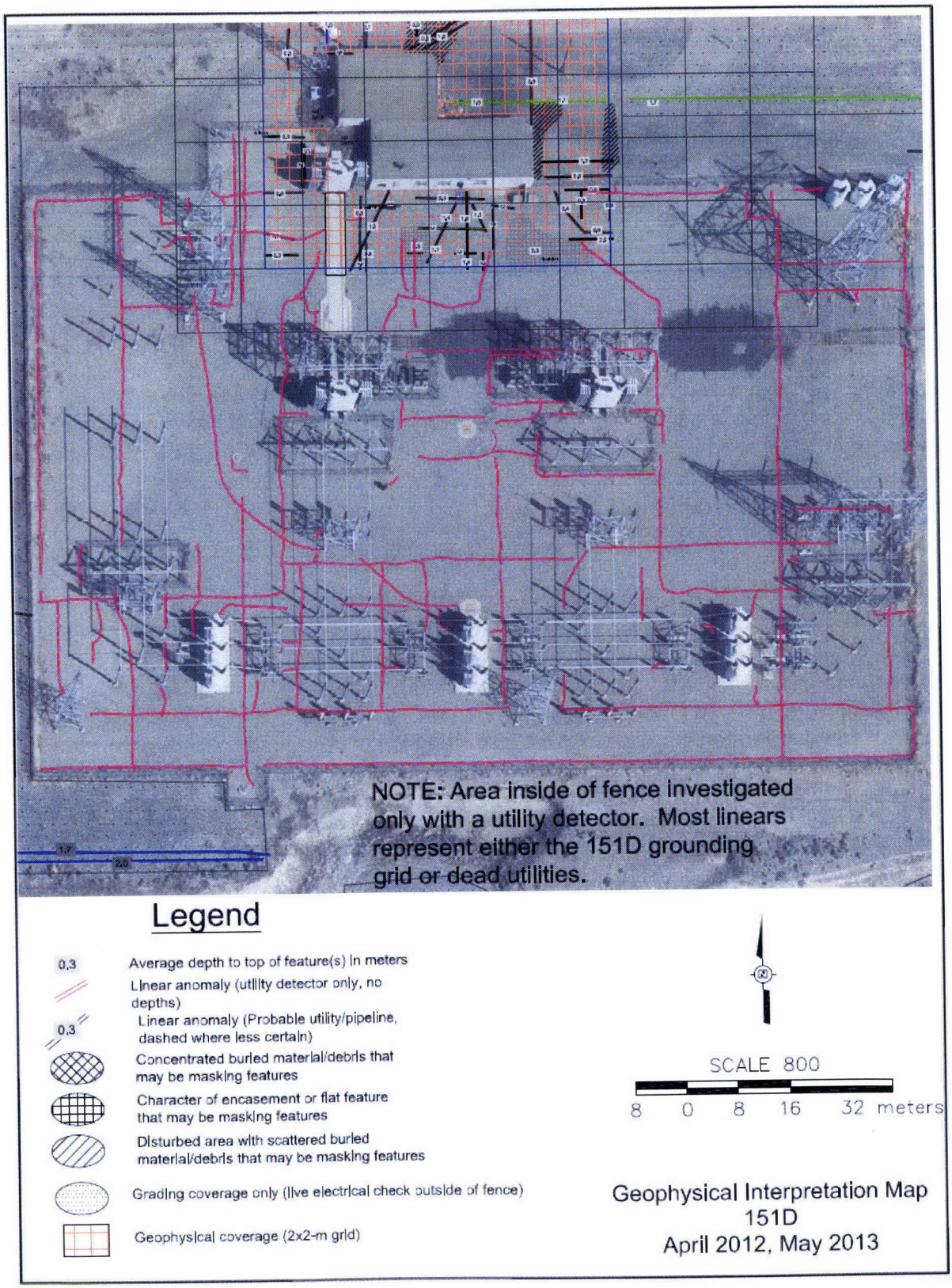
Figure 2. Geophysical Interpretation Map of the 100-D-75:1 Subsite.



REMEDIAL ACTION SUMMARY

The 151-D switchyard demolition was completed by the Deactivation, Decontamination, Decommissioning and Demolition (D4) Project on January 6, 2014. One of the objectives of the D4 Project was to support recycling and waste minimization. Being a radiologically clean facility, metals, oils, and electrical equipment from the 151-D switchyard were recycled at offsite facilities (WCH 2014c). The Washington Closure Hanford (WCH) subcontractor Transformer Technologies recycled 607,000 lb of transformers, transformer bushings, metal, and 800 gal of transformer oil. Mission Support Alliance recycled 205,060 lb of metal, beams, components, and wire. The remaining 3,084.7 tons of demolition debris was removed and disposed at the Environmental Restoration Disposal Facility (ERDF). In addition, the rail spur that entered the 100-D-75:1 switch yard was removed by D4 project between September 11 and October 9, 2013.

Remediation of the 100-D-75:1 subsite was performed between July 7 and October 28, 2014. Approximately 17,039 bank cubic meters (22,286 bank cubic yards) of excavated materials was removed and a small portion was staged prior to disposal at ERDF. The post-remediation boundary of the waste site and staging pile area is shown in Figure 3. The depth of the excavation varies between 1 m to 4 m (3.3 ft to 13.1 ft) across the subsite (Figure 4). Excavated materials consisted of concrete, rebar, asbestos conduit, steel pipe, wire, and stained soil.

During the 100-D-75:1 subsite remedial activities, oil-stained soils were discovered at several locations throughout the footprint of the 100-D-75:1 subsite. Over 70 in-process samples were collected from this subsite during the course of remediation. In-process sampling was performed when oil-stained soils were encountered and following removal of the stained soils to confirm removal of contaminated materials. All in-process sampling results are presented in Appendix C.

Concrete duct banks were encountered in the shallow zone of the 100-D-75:1 excavation (Figure 5). These duct banks contain electrical conduits made of asbestos piping with no other hazardous materials. The total thichness for the concrete duct banks varies greatly, some of the largest measure 0.9 by 0.9 m (3 by 3 ft). Per discussion with the Washington State Department of Ecology, documented in 100-D/H Interface Meeting Minutes (WCH 2014b), the concrete duct banks could be left in place if concrete was free of staining. The decision to leave concrete duct banks in place was based on waste minimization efforts. The field sampling personnel examined the concrete duct banks for staining, and no staining on these concrete structures was identified.

The excavated materials were stockpiled west of the excavation in the approved staging pile area. The staged materials were loaded out on August 14, 2014. Materials excavated from the waste site after this date were direct loaded for disposal at ERDF.

No overburden materials were salvaged from the 100-D-75:1 excavation; therefore, there is no overburden pile associated with the 100-D-75:1 subsite. Radiological field screening was performed during and immediately following remediation. No radiation was detected within the 100-D-75:1 excavation area.

Figure 3. The 100-D-75:1 Subsite Excavation and Staging Pile Area Location Map.

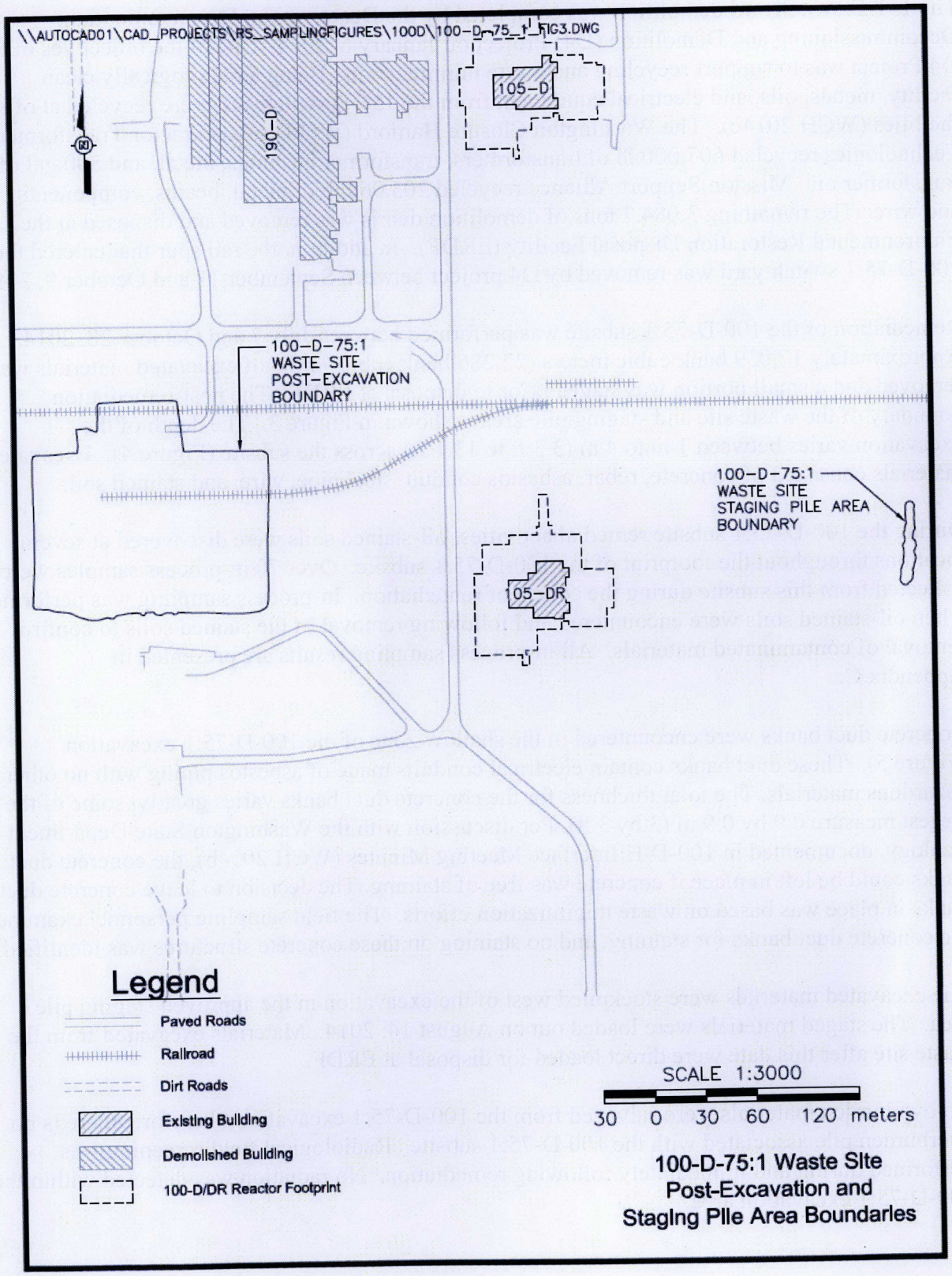


Figure 4. 100-D-75:1 Excavation Post-Remediation Topographic Map.

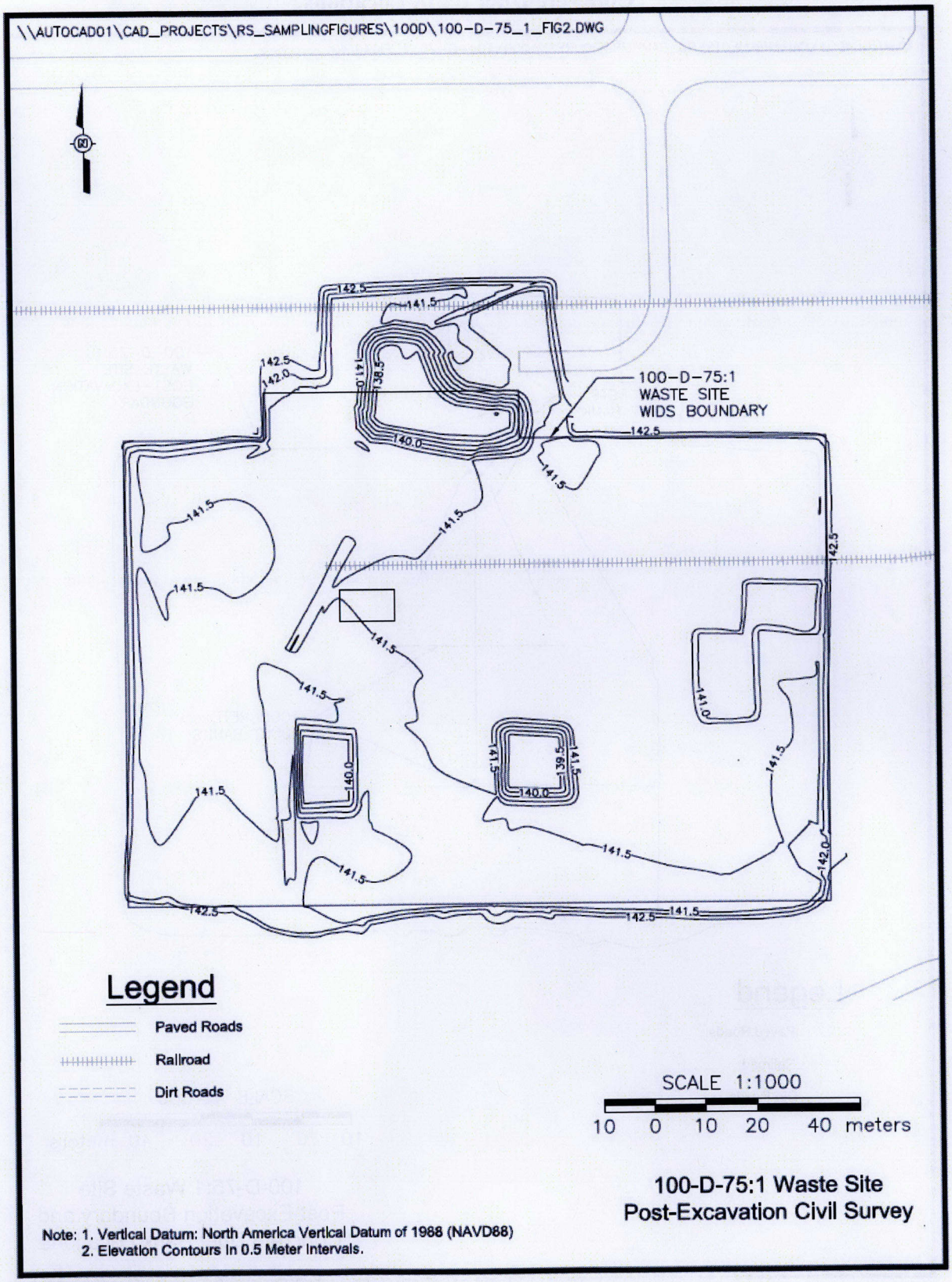
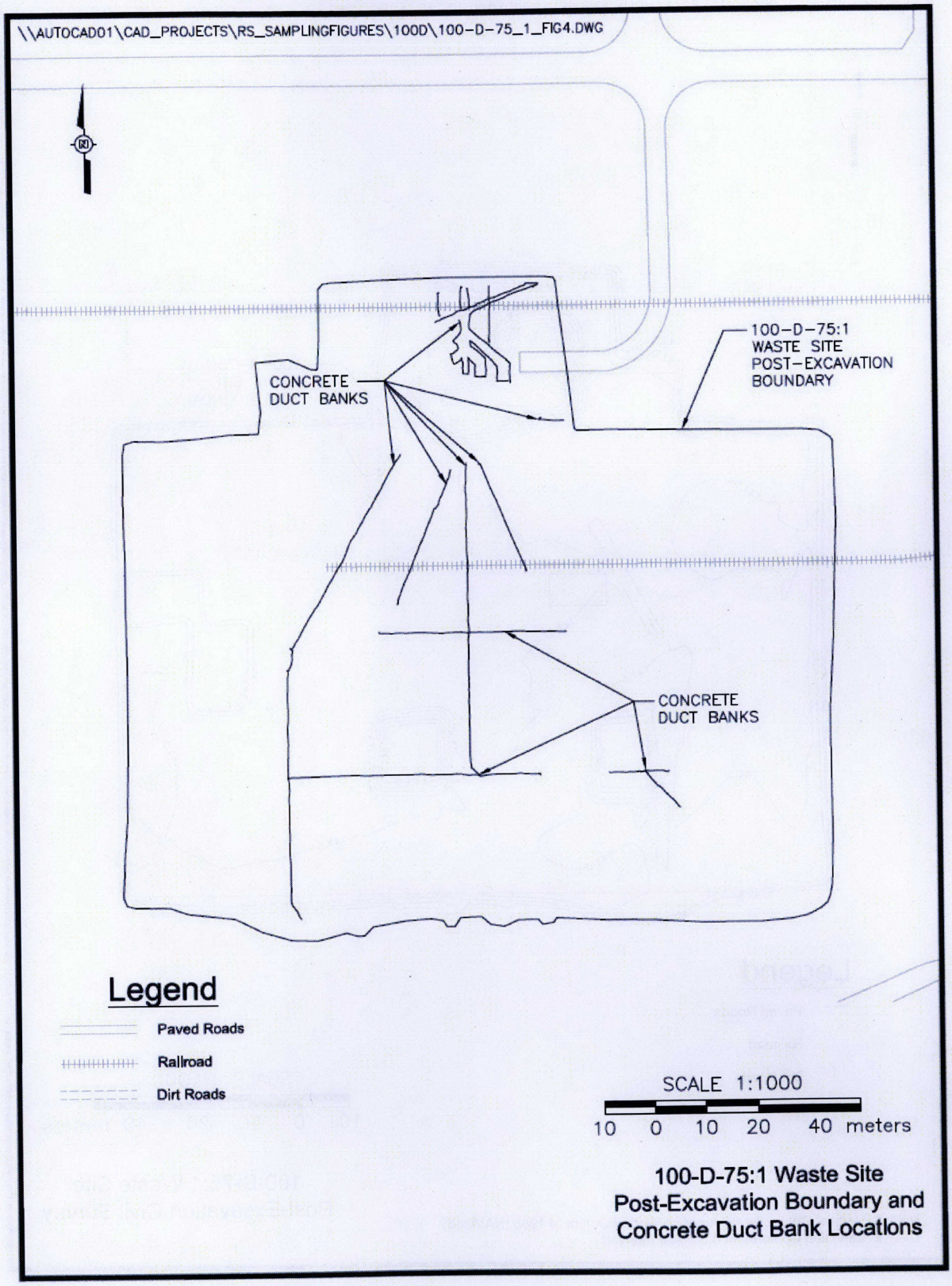


Figure 5. 100-D-75:1 Post-Remediation Boundary and Concrete Duct Bank Locations.



VERIFICATION SAMPLING ACTIVITIES

This section describes the basis for selection of a verification sampling design for the 100-D-75:1 subsite. Statistical sampling was the method chosen for selecting the sampling locations. The area identified for the purpose of statistical verification sampling for the 100-D-75:1 subsite consists of two decision units, the excavated area and the staging pile area.

Verification sampling of the excavation area and staging pile area was performed on February 2, 2015, per the *Work Instruction for Verification Sampling of the 100-D-75:1, 151-D Primary Electrical Substation Subsite* (WCH 2015b). Verification sampling at the 100-D-75:1 subsite was conducted to support a determination that residual contaminant concentrations in the soil meet cleanup criteria specified in the RDR/RAWP (DOE-RL 2009b) and the Remaining Sites ROD (EPA 1999). Separate statistical sampling designs were used to collect verification soil samples from the 100-D-75:1 excavated area and the staging pile area. The following subsections provide additional discussion of the information used to develop the verification sampling design. The results of verification sampling are also summarized to support interim closure of the subsite.

Contaminants of Potential Concern for Verification Sampling

The COPCs for the 100-D-75:1 subsite were determined based on potential hazardous constituents associated with leaks and spills from the electrical transformers, circuit breakers, and transfer systems. As such, the identified COPCs are PCBs, semivolatile organic compounds (SVOCs), the expanded list of inductively coupled plasma (ICP) metals (antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc), mercury, and total petroleum hydrocarbons (TPH).

In addition to unplanned oil and PCB releases to the soil, this subsite contained underground electrical cable, generally housed in fiber or transite conduit. The COPCs for the electrical cable are asbestos, the expanded list of ICP metals (antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc), mercury, and PCBs. Therefore, asbestos was included as a COPC for the 100-D-75:1 subsite, and separate samples were taken at each sample location for asbestos analysis.

Radiological activity was undetected during remediation activities; therefore, radionuclides were not included as COPCs for the 100-D-75:1 subsite.

Verification Sampling Design

Two decision units were identified for the 100-D-75:1 subsite and include the excavation area and the waste staging pile area. The statistical sampling design for the 100-D-75:1 subsite decision units was developed using Visual Sample Plan[1] (VSP). The areas identified for the purpose of statistical verification sampling for the 100-D-75:1 subsite were delineated in VSP

[1] Visual Sample Plan is a site map-based user-interface program that may be downloaded at http://vsp.pnnl.gov.

and used as the basis for a random-start systematic grid for verification soil sample collection at the site. Twelve statistical discrete soil samples were collected on the grid within each of the two decision units at the 100-D-75:1 subsite. A triangular grid was used based on studies that indicate triangular grids are superior to square grids (Gilbert 1987). Additional details concerning the use of VSP to develop the statistical sampling designs and derive the number of verification samples to collect are discussed in the verification work instruction (WCH 2015b) and in regulatory agreements (WCH 2014c). The 100-D-75:1 subsite sample locations are shown in Figures 6 and 7.

Figure 6. 100-D-75:1 Subsite Verification Sample Locations – Excavation Area.

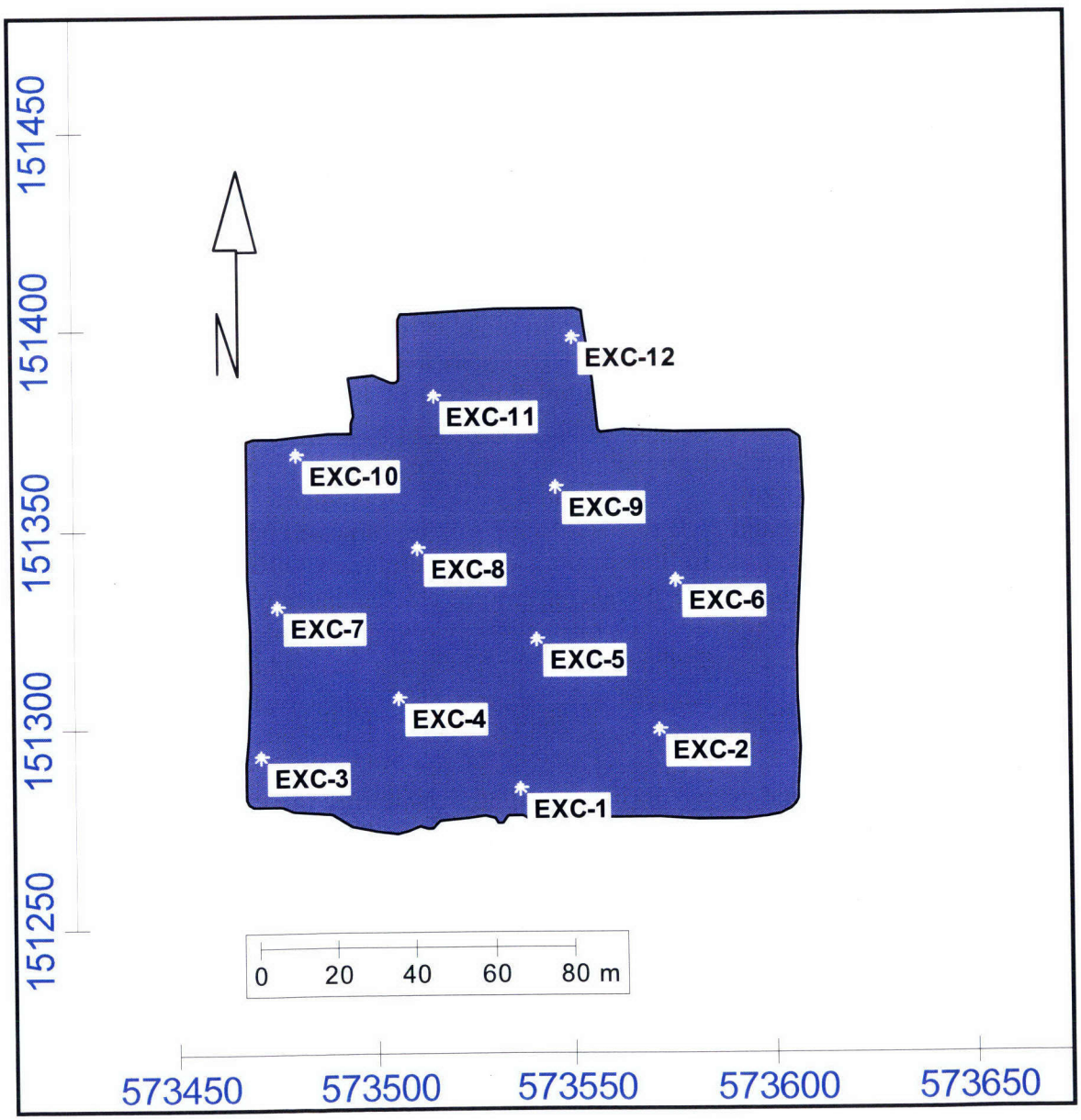
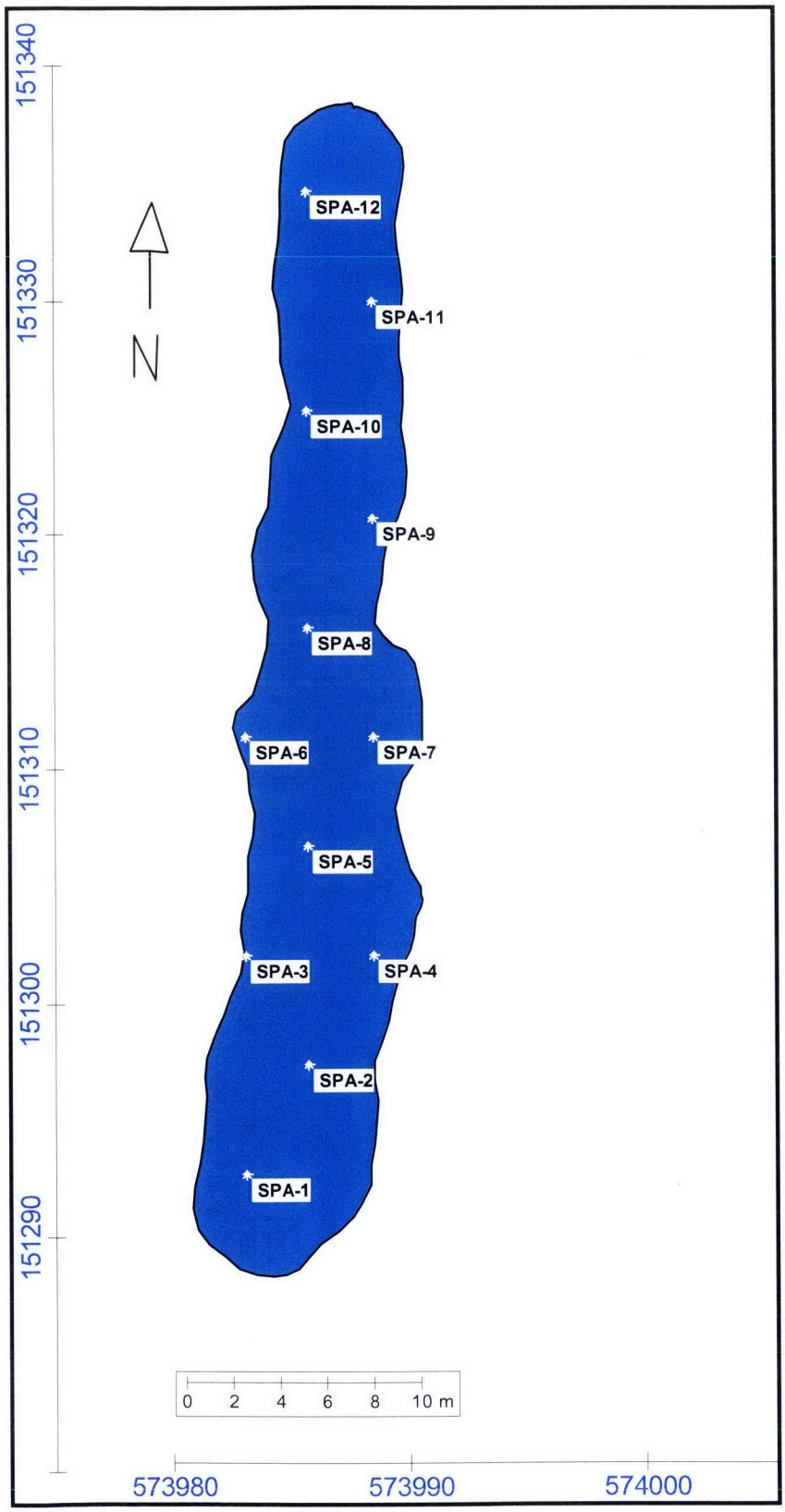


Figure 7. 100-D-75:1 Subsite Verification Sample Locations – Staging Pile Area.



A summary of the verification samples collected and laboratory analyses performed is provided in Table 1. All sampling was performed in accordance with ENV-1, *Environmental Monitoring & Management*, to fulfill the requirements of the *100 Area Remedial Action Sampling and Analysis Plan* (DOE-RL 2009a). Table 2 identifies the EPA-approved methods for the analyses performed for verification sampling. Additional information related to verification sampling can be found in the field sampling logbook (WCH 2015a).

Table 1. 100-D-75:1 Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number [a]	Washington State Plane (m)		Sample Analysis
		Northing	Easting	
Excavation Area				
EXC-1	J1V3P2, J1V3R5	151284.8	573536.2	ICP metals [b], mercury, PCBs, TPH, SVOCs, asbestos
EXC-2	J1V3P3, J1V3R6	151299.5	573571.3	
EXC-3	J1V3P4, J1V3R7	151293.1	573470.7	
EXC-4	J1V3P5, J1V3R8	151307.9	573505.9	
EXC-5	J1V3P6, J1V3R9	151322.6	573541	
EXC-6	J1V3P7, J1V3T0	151337.3	573576.2	
EXC-7	J1V3P8, J1V3T1	151330.9	573475.6	
EXC-8	J1V3P9, J1V3T2	151345.6	573510.7	
EXC-9	J1V3R0, J1V3T3	151360.4	573545.8	
EXC-10	J1V3R1, J1V3T4	151368.7	573480.4	
EXC-11	J1V3R2, J1V3T5	151383.4	573515.5	
EXC-12	J1V3R3, J1V3T6	151398.1	573550.7	
Duplicate of J1V3P5 J1V3R8	J1V3R4, J1V3T7	151307.9	573505.9	
Staging Pile Area				
SPA-1	J1V3T8, J1V3W2	151292.7	573983.1	ICP metals [b], mercury, PCBs, TPH, SVOCs, asbestos
SPA-2	J1V3T9, J1V3W3	151297.4	573985.8	
SPA-3	J1V3V0, J1V3W4	151302	573983.1	
SPA-4	J1V3V1, J1V3W5	151302	573988.5	
SPA-5	J1V3V2, J1V3W6	151306.7	573985.8	
SPA-6	J1V3V3, J1V3W7	151311.4	573983.1	
SPA-7	J1V3V4, J1V3W8	151311.4	573988.5	
SPA-8	J1V3V5, J1V3W9	151316	573985.8	
SPA-9	J1V3V6, J1V3X0	151320.7	573988.5	
SPA-10	J1V3V7, J1V3X1	151325.4	573985.8	
SPA-11	J1V3V8, J1V3X2	151330	573988.5	
SPA-12	J1V3V9, J1V3X3	151334.7	573985.8	
Duplicate of J1V3T8 J1V3W2	J1V3W0, J1V3X4	151292.7	573983.1	

Table 1. 100-D-75:1 Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number [a]	Washington State Plane (m)		Sample Analysis
		Northing	Easting	
Equipment blank	J1V3W1	NA	NA	ICP metals [b], mercury

[a] The second HEIS sample number for each sample location is for asbestos analysis.

[b] The expanded list of ICP metals included antimony, arsenic, barium, beryllium, boron, cadmium, chromium (total), cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc in the analytical results package.

HEIS = Hanford Environmental Information System
ICP = inductively coupled plasma
NA = not applicable
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TPH = total petroleum hydrocarbons

Table 2. Laboratory Analytical Methods for the 100-D-75:1 Subsite.

Analytical Method	COC/COPC
ICP metals – EPA Method 6010	ICP metals [a]
Mercury – EPA Method 7471	Mercury
PCB – EPA Method 8082	Polychlorinated biphenyls
TPH – NWTPH-Dx	Total petroleum hydrocarbons [b]
SVOA – EPA Method 8270	Semivolatile organic compounds
Bulk asbestos – NIOSH Method 7400	Asbestos

[a] The expanded list of ICP metals included antimony, arsenic, barium, beryllium, boron, cadmium, chromium (total), cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc in the analytical results package.

[b] The total petroleum hydrocarbons included TPH – diesel range, and TPH – diesel range extended analysis.

COC = contaminant of concern
COPC = contaminant of potential concern
EPA = U.S. Environmental Protection Agency
ICP = inductively coupled plasma
NIOSH = National Institute for Occupational Safety and Health
NWTPH-Dx = Northwest total petroleum hydrocarbons-diesel range organics
PCB = polychlorinated biphenyl
SVOA = semivolatile organic compound
TPH = total petroleum hydrocarbons

Verification Sampling Results

All verification samples were analyzed using analytical methods approved by EPA (DOE-RL 2009b). Evaluation of the verification data from the 100-D-75:1 subsite was performed by direct comparison of the statistical or maximum sample results for each COPC against cleanup criteria.

The primary statistical calculation to evaluate compliance with cleanup standards is the 95% upper confidence limit (UCL) on the arithmetic mean of the data. The 95% UCL values for each detected COPC are computed for each of the 100-D-75:1 decision units as specified by the RDR/RAWP (DOE-RL 2009b). The calculations are provided in Appendix B. When a nonradionuclide COPC was detected in fewer than 50% of the verification samples collected for a decision unit, the maximum detected value was used for comparison to remedial action goals (RAGs). If no detections for a given COPC were reported in the data set, then no statistical calculation or evaluation was performed for that COPC.

Comparisons of the results for site COPCs with the RAGs for each of the 100-D-75:1 decision units are listed in Tables 3 and 4. Contaminants that were not detected by laboratory analysis are excluded from these tables. Calculated cleanup levels are not presented in the Cleanup Levels and Risk Calculations Database (Ecology 2015) under WAC 173-340-740(3) for calcium, magnesium, potassium, silicon, and sodium. The EPA's *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)* (EPA 1989) recommends that aluminum and iron not be considered in site risk evaluations. Therefore, aluminum, calcium, iron, magnesium, potassium, silicon, and sodium are not considered site COPCs and are also not included in these tables.

Table 3. Comparison of Contaminant Concentrations to Action Levels for the 100-D-75:1 Excavation Statistical Verification Samples. (2 Pages)

COPC	Statistical or Maximum Result [b] (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Antimony	0.95 (<BG)	32	5 [c]	5 [c]	No	--
Arsenic	3.7 (<BG)	20 [c]	20 [c]	20 [c]	No	--
Barium	63.9 (<BG)	5,600	200	400	No	--
Beryllium	0.20 (<BG)	10.4 [g]	1.51 [c]	1.51 [c]	No	--
Boron [d]	1.3	7,200	320	-- [e]	No	--
Cadmium [f]	0.089 (<BG)	13.9 [g]	0.81 [c]	0.81 [c]	No	--
Chromium	11.4 (<BG)	80,000	18.5 [c]	18.5 [c]	No	--
Cobalt	8.6 (<BG)	24	15.7 [c]	-- [e]	No	--
Copper	16.7 (<BG)	2,960	59.2	22.0 [c]	No	--
Lead	4.2 (<BG)	353	10.2 [c]	10.2 [c]	No	--
Manganese	320 (<BG)	3,760	512 [c]	512 [c]	No	--
Mercury	0.014 (<BG)	24	0.33 [c]	0.33 [c]	No	--
Nickel	12.3 (<BG)	1,600	19.1 [c]	27.4	No	--
Vanadium	65.8 (<BG)	560	85.1 [c]	-- [e]	No	--
Zinc	48.7 (<BG)	24,000	480	67.8 [c]	No	--
TPH – diesel range	13	200	200	200	No	--
TPH – diesel range EXT	21	200	200	200	No	--
Phenanthrene [j]	0.019	24,000	240	1,920	No	--

Table 3. Comparison of Contaminant Concentrations to Action Levels for the 100-D-75:1 Excavation Statistical Verification Samples. (2 Pages)

COPC	Statistical or Maximum Result [b] (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Pyrene	0.023	2,400	48	192	No	--
Aroclor-1260	0.046	0.5	0.017 [h]	0.017 [h]	Yes	Yes [i]

[a] RAGs obtained from the RDR/RAWP (DOE-RL 2009b).
[b] Maximum or 95% UCL, depending on data censorship, as described in the *100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations* (Appendix B).
[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700(6)(d) (Ecology 1996). The arsenic cleanup level 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the RDR/RAWP (DOE-RL 2009b).
[d] No Hanford Site-specific or Washington State background value available.
[e] No parameters (bioconcentration factors or ambient water quality criteria values) are available from the Washington State Department of Ecology Cleanup Levels and Risk Calculations database (Ecology 2015) or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], Ecology 1996 [Method B for surface waters]).
[f] Hanford Site-specific background value is not available; it was not evaluated during background study. Value used is from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).
[g] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3]) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).
[h] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.
[i] Based on RESRAD modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b), the residual concentrations of aroclor-1260 are not predicted to migrate vertically within 1,000 years (based on the distribution coefficient of 822 mL/g). A contaminant with a distribution coefficient of 80 mL/g or greater is not predicted to migrate vertically through the soil. The distance to groundwater from the bottom of the excavation area is 21 m (69 ft). Therefore, residual concentrations of this constituent are predicted to be protective of groundwater and the Columbia River.
[j] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals: phenanthrene; surrogate: anthracene

-- = not applicable
BG = background
COPC = contaminant of potential concern
EPA = U.S. Environmental Protection Agency
RAG = remedial action goal
RDL = required detection limit
RDR/RAWP = remedial design report/remedial action work plan
RESRAD = RESidual RADioactivity (dose model)
TPH = total petroleum hydrocarbons
UCL = upper confidence limit
WAC = *Washington Administrative Code*

Table 4. Comparison of Contaminant Concentrations to Action Levels for the 100-D-75:1 Staging Pile Area Statistical Verification Samples.

COPC	Statistical or Maximum Result [b] (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Antimony	1.5 (<BG)	32	5 [c]	5 [c]	No	--
Arsenic	2.7 (<BG)	20 [c]	20 [c]	20 [c]	No	--
Barium	49.1 (<BG)	5,600	200	400	No	--
Beryllium	0.20 (<BG)	10.4 [d]	1.51 [c]	1.51 [c]	No	--
Cadmium [e]	0.14 (<BG)	13.9 [d]	0.81 [c]	0.81 [c]	No	--
Chromium	5.0 (<BG)	80,000	18.5 [c]	18.5 [c]	No	--
Cobalt	10.2 (<BG)	24	15.7 [c]	-- [f]	No	--
Copper	17.3 (<BG)	2,960	59.2	22.0 [c]	No	--
Lead	3.6 (<BG)	353	10.2 [c]	10.2 [c]	No	--
Manganese	326 (<BG)	3,760	512 [c]	512 [c]	No	--
Mercury	0.0073 (<BG)	24	0.33 [c]	0.33 [c]	No	--
Nickel	9.8 (<BG)	1,600	19.1 [c]	27.4	No	--
Vanadium	75.0 (<BG)	560	85.1 [c]	-- [f]	No	--
Zinc	48.0 (<BG)	24,000	480	67.8 [c]	No	--
TPH – diesel range	2.7	200	200	200	No	--
TPH – diesel range EXT	3.0	200	200	200	No	--
Aroclor-1260	0.0030	0.5	0.017 [g]	0.017 [g]	No	--

[a] RAGs obtained from the RDR/RAWP (DOE-RL 2009b).

[b] Maximum or 95% UCL, depending on data censorship, as described in the *100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations* (Appendix B).

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700(4)(d) (Ecology 1996). The arsenic cleanup level 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the RDR/RAWP (DOE-RL 2009b).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3]) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

[e] Hanford Site-specific background value is not available; it was not evaluated during background study. Value used is from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).

[f] No parameters (bioconcentration factors or ambient water quality criteria values) are available from the Washington State Department of Ecology Cleanup Levels and Risk Calculations database (Ecology 2015) or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], Ecology 1996 [Method B for surface waters]).

[g] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

-- = not applicable
BG = background
COPC = contaminant of potential concern
EPA = U.S. Environmental Protection Agency
RAG = remedial action goal
RDL = required detection limit
RDR/RAWP = remedial design report/remedial action work plan
RESRAD = RESidual RADioactivity (dose model)
TPH = total petroleum hydrocarbons
UCL = upper confidence limit
WAC = *Washington Administrative Code*

The complete laboratory results are stored in a WCH project-specific database prior to submitting to the Hanford Environmental Information System (HEIS) for archiving and are provided in Appendix B.

DATA EVALUATION

This section demonstrates that remedial actions at the 100-D-75:1 subsite have achieved the applicable RAGs developed to support unrestricted land use at the 100 Area as established in the Remaining Sites ROD (EPA 1999) and documented in the RDR/RAWP (DOE-RL 2009b).

Attainment of Nonradionuclide RAGs

All COPCs for all sampling areas were quantified below their respective soil RAGs or lookup values with the exception of aroclor-1260 in comparison against the soil RAGs for groundwater and/or river protection in the site excavation and staging pile area decision units. However, given the soil-partitioning coefficient (K_d) of 822 mL/g for aroclor-1260, residual concentrations of aroclor-1260 are not predicted to migrate vertically within 1,000 years based on RESidual RADioactivity (RESRAD) modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b). A contaminant with a K_d of 80 mL/g or greater is not predicted to migrate vertically through the soil. The vadose zone thickness beneath the excavation is approximately 21 m (69 ft). Therefore, residual concentrations of aroclor-1260 are predicted to be protective of groundwater (and thus the Columbia River).

Three-Part Test for Nonradionuclides

A RAG requirement for nonradionuclides is the WAC 173-340-740(7)(e) three-part test, which consists of the following criteria: (1) the cleanup verification 95% UCL value must be less than the cleanup level, (2) no single detection shall exceed two times the cleanup criteria, and (3) the percentage of samples exceeding the cleanup criteria must be less than 10% of the data set.

The application of the three-part test for the 100-D-75:1 subsite is included in the statistical calculations, where half or more of the data set analyses were detected (Appendix B). The results of this evaluation indicate that all residual COPC concentrations pass the three-part test in comparison against applicable RAGs.

An additional application of the three-part test is included for the statistical data sets that default to the maximum because less than half of the data set analyses were detected. The results of this evaluation indicate that residual COPC concentrations pass the three-part test in comparison against applicable RAGs, with the exception of aroclor-1260. The residual concentrations of aroclor-1260 are not expected to migrate in 1,000 years (based on the lowest K_d of the contaminants [aroclor-1260with a K_d of 822 mL/g). A contaminant with a K_d of 80 mL/g or greater is not predicted to migrate vertically through the soil. With approximately 21 m (69 ft) of vadose zone below the excavation area, residual concentrations of aroclor-1260 are predicted to be protective of groundwater and the Columbia River.

Nonradionuclide Direct Contact Hazard Quotient and Carcinogenic Risk RAGs Attained

Nonradionuclide risk requirements include an individual hazard quotient of less than 1.0, a cumulative hazard quotient of less than 1.0, an individual contaminant carcinogenic risk of less than 1×10^{-6}, and a cumulative carcinogenic risk of less than 1×10^{-5}. For the 100-D-75:1 subsite, these risk values were not calculated for constituents that were either not detected or were detected at concentrations below Hanford Site or Washington State background. All individual hazard quotients for noncarcinogenic constituents were less than 1.0. The cumulative hazard quotient for those noncarcinogenic constituents above background or detected levels is 1.9×10^{-4}. The carcinogenic risk value for aroclor-1260, the only carcinogenic constituent detected above background levels, is 9.2×10^{-8}, which is below the individual and cumulative cancer risk standards of 1×10^{-6}, and 1×10^{-5}, respectively. Therefore, the 100-D-75:1 subsite meets the requirements for the direct contact hazard quotient and excess carcinogenic risk as identified in the RDR/RAWP (DOE-RL 2009b).

Nonradionuclide Groundwater Hazard Quotient and Carcinogenic Risk RAGs Attained

Assessment of the risk requirements for the 100-D-75:1 subsite included calculation of the hazard quotient and carcinogenic (excess cancer) risk values for groundwater protection for nonradionuclides. The requirements include an individual and cumulative hazard quotient of less than 1.0, an individual excess carcinogenic risk of less than 1×10^{-6}, and a cumulative excess carcinogenic risk of less than 1×10^{-5}. These risk values were conservatively calculated for the entire waste site using the highest value for each COPC from each of the decision units. Risk values were calculated for constituents that were detected at concentrations above Hanford Site or Washington State background values or for which there is no background value. In addition, the K_d values for these contaminants are less than that necessary to show no migration to groundwater in 1,000 years based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b). Based on this model and a vadose zone of approximately 21 m (69 ft) in thickness at the excavation, a K_d of 3.6 or greater is required to show no predicted migration to groundwater within 1,000 years. The hazard quotient for boron, the only constituent at the 100-D-75:1 subsite subject to the groundwater hazard quotient calculation, is 4.1×10^{-3}, which is less than 1.0. The 100-D-75:1 subsite does not have any carcinogenic constituents subject to the groundwater cancer risk calculation; therefore, the criterion for excess cancer risk is met. Nonradionuclide risk requirements related to groundwater are met.

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the verification sampling approach, the field logbook (WCH 2015a), and resulting analytical data with the sampling and data quality requirements specified by the project objectives and performance specifications. The DQA for the 100-D-75:1 subsite established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances. The evaluation verified that the sample design was sufficient for the purpose of clean site verification. The cleanup verification sample analytical data are stored in the WCH project-specific database for data

evaluation prior to its archival in HEIS and are summarized in Appendix B. The detailed DQA is presented in Appendix D.

SUMMARY FOR INTERIM CLOSURE

The 100-D-75:1 subsite has been evaluated in accordance with the Remaining Sites ROD (EPA 1999) and the RDR/RAWP (DOE-RL 2009b). Verification sampling was performed, and the analytical results indicate that the residual concentrations of COPCs at this subsite meet the remedial action objectives for direct exposure, groundwater protection, and river protection. In accordance with this evaluation, the verification sampling results support a reclassification of the 100-D-75:1 subsite to Interim Closed Out. Site contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in the deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

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APPENDIX A

ECOLOGICAL RISK COMPARISON TABLE

Table A-1. Contaminants Exceeding Ecological Screening Levels for the 100-D-75:1 Subsite [a].

Hazardous Substance		2007 WAC 173-340, Table 749-3			EPA Ecological Soil Screening Levels [b]				Waste Site Analyses
		Plants	Soil Biota	Wildlife	Plants	Soil Biota	Avian [c]	Mammalian [c]	
Metals (mg/kg)									
	Background								
Antimony	5	5	--	--	--	78	--	0.27	1.5 (<BG)
Boron [d]	--	0.5	--	--	--	--	--	--	1.3
Manganese	512	1,100 [e]	--	1,500	220	450	4,300	4,000	326 (<BG)
Vanadium	85.1	2	--	--	--	--	7.8	280	75.0 (<BG)
Zinc	67.8	86 [e]	200	360	160	120	46	79	48.7 (<BG)

NOTE: Shaded cells are exceeded by the maximum or the statistical result.
Blank cells = Values not available.

[a] Exceedance of screening values does not necessarily indicate the existence of risk to ecological receptors. All exceedances must be evaluated in the context of additional lines of evidence for ecological effects following a baseline risk assessment for the river corridor portion of the Hanford Site, which will include a more complete quantitative ecological risk assessment.

[b] Available on the Internet at www.epa.gov/ecotox/ecossl.

[c] Wildlife.

[d] No Hanford Site-specific or Washington State background available.

[e] Benchmark replaced by Washington State natural background concentration from Ecology, 1994, *Natural Background Soil Metals Concentrations in Washington State*, Publication 94-115, Washington State Department of Ecology, Olympia, Washington.

BG = background
EPA = U.S. Environmental Protection Agency
WAC = *Washington Administrative Code*

APPENDIX B

CALCULATIONS

APPENDIX B

CALCULATION BRIEFS

The calculations provided in this appendix are copies of the originals that are kept in the active Washington Closure Hanford project files and are available upon request. When the project is completed, the files will be stored in a U.S. Department of Energy, Richland Operations Office repository. These calculations have been prepared in accordance with ENG-1, *Engineering Services*, ENG-1-4.5, "Project Calculations," Washington Closure Hanford, Richland, Washington. The calculations provided in this appendix include the following:

100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations, 0100D-CA-V0595, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-D-75:1 Subsite Direct Contact Hazard Quotient and Carcinogenic Risk Calculation, 0100D-CA-V0596, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-D-75:1 Subsite Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater, 0100D-CA-V0597, Rev. 0, Washington Closure Hanford, Richland, Washington.

DISCLAIMER FOR CALCULATIONS

The calculations that are provided in this appendix have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Acrobat 8.0

CALCULATION COVER SHEET

Project Title: 100-D Area Closure Operations **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0595

Subject: 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations

Computer Program: Excel Program No: Excel 2010

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 16 Attm. 1 = 14 Total = 31	J. D. Skoglie	I. B. Berezovskiy	R. J. Nielson	S. G. Wilkinson	6/25/15

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie **Date** 04/06/15 **Calc. No.** 0100D-CA-V0595 **Rev. No.** 0
Project 100-D Area Closure Operations **Job No.** 14655 **Checked** I. B. Berezovskiy **Date** 04/06/15
Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations **Sheet No.** 1 of 16

Summary

Purpose:
Calculate the 95% upper confidence limit (UCL) values to evaluate compliance with cleanup standards for the subject site. Also, perform the *Washington Administrative Code* (WAC) 173-340-740(7)(e) Model Toxics Control Act (MTCA) 3-part test for nonradionuclide analytes and calculate the relative percent difference (RPD) for primary-duplicate sample pairs for each contaminant of concern (COC) and contaminant of potential concern (COPC), as necessary.

Table of Contents:
Sheets 1 to 4 - Calculation Sheet Summary
Sheets 5 to 10 - Calculation Sheet Verification Data for Statistical and Maximum - Excavation and Staging Pile Area
Sheets 11 to 14 - Ecology Software (MTCAStat) Results
Sheet 15 to 16 - Calculation Sheet - Duplicate Analysis
Attachment 1 - 100-D-75:1 Subsite, Verification Sampling Results (14 pages).

Given/References:
1) Sample Results (Attachment 1).
2) DOE-RL, 2009a, *100 Area Remedial Action Sampling and Analysis Plan* (SAP), DOE/RL-96-22, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
3) DOE-RL, 2009b, *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP), DOE/RL-96-17, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
4) Ecology, 1992, *Statistical Guidance for Ecology Site Managers*, Publication #92-54, Washington Department of Ecology, Olympia, Washington.
5) Ecology, 1993, *Statistical Guidance for Ecology Site Managers, Supplement S-6, Analyzing Site or Background Data with Below-detection Limit or Below-PQL Values (Censored Data Sets),* Publication #92-54, Washington Department of Ecology, Olympia, Washington.
6) Ecology, 2011, Cleanup Levels and Risk Calculations (CLARC) Database, Washington State Department of Ecology, Olympia, Washington, <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.
7) EPA, 1989, *Risk Assessment Guidance for Superfund:* Volume 1, *Human Health Evaluation Manual, Part A; Interim Final,* EPA/540/1-89/002, U.S. Environmental Protection Agency, Washington, D. C.
8) WAC 173-340, 1996, "Model Toxic Control Act - Cleanup," *Washington Administrative Code.*

Solution:
Calculation methodology is described in Ecology Pub. #92-54 (Ecology 1992, 1993), below, and in the RDR/RAWP (DOE-RL 2009b). Use data from attached worksheets to perform the 95% UCL calculation for each analyte, the WAC 173-340-740(7)(e) 3-part test for nonradionuclides, and the RPD calculations for each COC/COPC. The hazard quotient and carcinogenic risk calculations are located in a separate calculation brief as an appendix to the Remaining Sites Verification Package (RSVP).

Calculation Description:
The subject calculations were performed on statistical data from soil verification samples (Attachment 1) from the 100-D-75:1 Subsite. The data were entered into an EXCEL 2010 spreadsheet and calculations performed by using the built-in spreadsheet functions and/or creating formulae within the cells. The statistical evaluation of data for use in accordance with the RDR/RAWP (DOE-RL 2009b) is documented by this calculation. Duplicate RPD results are used in evaluation of data quality within the RSVP for these sites.

Methodology:
The 100-D-75:1 Subsite underwent statistical sampling at two decision units for verification sampling, consisting of the excavation and staging pile area.

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Summary (continued)

Methodology, continued:

For nonradioactive analytes with ≤50% of the data below detection limits, the statistical value calculated to evaluate the effectiveness of cleanup is the 95% UCL. For nonradioactive analytes with >50% of the data below detection limits, as determined by direct inspection of the sample results (Attachment 1), the maximum detected value for the data set is used instead of the 95% UCL, and no further calculations are performed for those data sets. For convenience, these maximum detected values are included in the summary tables that follow. The 95% UCL was not calculated for data sets with no reported detections. Calculated cleanup levels are not available in Ecology (2011) under WAC 173-340-740(3) for calcium, magnesium, potassium, silicon, and sodium. The EPA's *Risk Assessment Guidance* for Superfund (EPA 1989) recommends that aluminum and iron not be considered in site risk evaluations. Therefore, aluminum, calcium, iron, magnesium, potassium, silicon, and sodium are not considered site COCs/COPCs and are also not included in these calculations.

All nonradionuclide data reported as being undetected are set to ½ the detection limit value for calculation of the statistics (Ecology 1993). For the statistical evaluation of duplicate sample pairs, the samples are averaged before being included in the data set, after adjustments for censored data as described above. For radionuclide data, calculation of the statistics is done using the reported value. In cases where the laboratory does not report a value below the minimum detectable activity (MDA), half of the MDA is used in the calculation. For the statistical evaluation of duplicate sample pairs, the samples are averaged before being included in the data set, after adjustments for censored data as described above.

For nonradionuclides, the WAC 173-340 statistical guidance suggests that a test for distributional form be performed on the data and the 95% UCL calculated on the appropriate distribution using Ecology software. For nonradionuclide small data sets (n<10), the calculations are performed assuming nonparametric distribution, so no tests for distribution are performed. For nonradionuclide data sets of ten or greater, as for the subject site, distributional testing is done using Ecology's MTCAStat software (Ecology 1993). Due to differences in addressing censored data between the RDR/RAWP (DOE-RL 2009b) and MTCAStat coding and due to a limitation in the MTCAStat coding (no direct capability to address variable quantitation limits within a data set), substitutions for censored data are performed before software input and the resulting data set treated as uncensored.

The WAC 173-340-740(7)(e) 3-part test is performed for nonradionuclide analytes only and determines if:
1) the 95% UCL exceeds the most stringent cleanup limit for each COPC/COC,
2) greater than 10% of the raw data exceed the most stringent cleanup limit for each COPC/COC,
3) the maximum value of the raw data set exceeds two times the most stringent cleanup limit for each COPC/COC.

The RPD is calculated when both the primary value and the duplicate value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDLs are pre-determined values for analytical methods and constituents with cleanup levels as listed in Table 2-1 of the SAP (DOE-RL 2009a). Table 2-1 includes nominal TDLs for identified methods based organic analyses. The nominal TDLs are also used in support of the RPD calculation for the methods based analytes. TDLs not included in Table 2-1 are based on the laboratory and/or methods used. Where direct evaluation of the attached sample data showed that a given analyte was not detected in the primary and/or duplicate sample, further evaluation of the RPD value was not performed. The RPD calculations use the following formula:

$$RPD = [\,|M-S|/((M+S)/2)]*100$$

where, M = Main Sample Value S = Split (or duplicate) Sample Value

For quality assurance/quality control (QA/QC) split and duplicate RPD calculations, a value less than 30% indicates the data compare favorably. If the RPD is greater than 30%, further investigation regarding the usability of the data is performed. To assist in the identification of anomalous sample pairs, when an analyte is detected in the primary or duplicate sample, but was quantified at less than 5 times the TDL in one or both samples, an additional parameter is evaluated. In this case, if the difference between the primary and duplicate results exceeds a control limit of 2 times the TDL, further assessment regarding the usability of the data is performed. Additional discussion as necessary is provided in the data quality assessment section of the applicable RSVP.

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Summary (continued)

QUALIFIER LIST

B = Estimated result.
C = Analyte was detected in both the sample and the associated QC blank, and the sample concentration was ≤ 5x the blank concentration.
J = Estimate
M = Sample duplicate precision not met
N = Recovery exceeds upper or lower control limits.
U = Undetected
X (metals) = Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

ACRONYM LIST

-- = not applicable
DE = direct exposure
EXC = excavation
GW = groundwater
MDL = method detection limit
MTCA = *Model Toxics Control Act*
NA = not applicable
PQL = practical quantitation limit
Q = qualifier
QA/QC = quality assurance/quality control
RAG = remedial action goal
RDR/RAWP = remedial design report/remedial action work plan
RESRAD = RESidual RADioactivity (dose model)
RPD = relative percent difference
RSVP = remaining sites verification package
SAP = sampling and analysis plan
SPA = staging pile area
TDL = target detection limit
UCL = upper confidence limit
WAC = Washington Administrative Code

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Results:
The results presented in the tables that follow include the summary of the results of the 95% UCL and maximum calculations for the excavation, staging pile area, the WAC 173-340-740(7)(e) 3-part test evaluation, and the RPD calculations, and are for use in risk analysis and the RSVP for this site.

Results Summary - 100-D-75:1 Subsite [a]

Analyte	EXC		SPA		Units
	95% UCL Result	Maximum Result	95% UCL Result	Maximum Result	
Antimony	0.95	--	1.5	--	mg/kg
Arsenic	3.7	--	2.7	--	mg/kg
Barium	63.9	--	49.1	--	mg/kg
Beryllium	0.20	--	0.20	--	mg/kg
Boron	1.3	--	--	--	mg/kg
Cadmium	0.089	--	0.14	--	mg/kg
Chromium	11.4	--	5.0	--	mg/kg
Cobalt	8.6	--	10.2	--	mg/kg
Copper	16.7	--	17.3	--	mg/kg
Lead	4.2	--	3.6	--	mg/kg
Manganese	320	--	326	--	mg/kg
Mercury	0.014	--	--	0.0073	mg/kg
Nickel	12.3	--	9.8	--	mg/kg
Vanadium	65.8	--	75.0	--	mg/kg
Zinc	48.7	--	48.0	--	mg/kg
TPH - Diesel Range	13	--	2.7	--	mg/kg
TPH - Diesel Range EXT	21	--	3.0	--	mg/kg
Aroclor-1260	--	0.046	--	0.0030	mg/kg
Phenanthrene	--	0.019	--	--	mg/kg
Pyrene	--	0.023	--	--	mg/kg

3-Part Test Evaluation

	EXC		SPA	
95% UCL or Maximum > Cleanup Limit?	NO	YES	NO	NO
> 10% above Cleanup Limit?	NO	NO	NO	NO
Any sample > 2x Cleanup Limit?	NO	YES	NO	NO

[a]The 95% UCL result or maximum value, depending on data censorship, as described in the methodology section.

Relative Percent Difference Results and QA/QC Analysis[a]

Analyte	Excavation	Staging Pile Area
Aluminum	14.0%	10.2%
Barium	28.6%	5.0%
Calcium	2.7%	5.6%
Copper	17.3%	4.1%
Iron	17.5%	10.1%
Magnesium	***30.5%***	11.4%
Manganese	20.0%	11.8%
Silicon	17.1%	15.8%
Sodium	3.2%	14.9%
Vanadium	***33.5%***	0.5%
Zinc	17.6%	4.8%

[a] RPD listed where result produced, based on criteria. If RPD not required, no value is listed. The significance of the reported RPD values, including values greater than 30%, is addressed in the data quality assessment section of the RSVP.

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1 **100-D-75:1 Subsite Statistical Calculations**

2 **Verification Data - Excavation**

3	Sample	Sample	Sample	Antimony			Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	EXC-4	J1V3P5	2/2/15	1.7	UJ	1.7	1.5		0.57	47.1	X	0.066	0.14	U	0.14	0.85	U	0.85	0.049	B	0.036	3.8		0.050	10.1	X	0.43	18.2		0.94
6	Duplicate of J1V3P5	J1V3R4	2/2/15	0.66	J	0.34	1.5		0.58	35.3	X	0.067	0.081	B	0.029	0.87	U	0.87	0.045	B	0.036	3.3		0.051	7.4	X	0.088	15.3		0.19
7	EXC-1	J1V3P2	2/2/15	0.51	JB	0.41	3.8		0.72	61.1	X	0.083	0.21	B	0.036	1.4	BM	1.1	0.091	B	0.045	13.3		0.063	7.0	X	0.11	15.8		0.24
8	EXC-2	J1V3P3	2/2/15	0.62	J	0.39	3.6		0.67	52.3	X	0.078	0.18	B	0.034	1.9	B	1.0	0.052	B	0.042	9.8		0.059	7.1	X	0.10	17.0		0.22
9	EXC-3	J1V3P4	2/2/15	0.74	J	0.39	2.8		0.68	56.8	X	0.078	0.21		0.034	1.9	B	1.0	0.097	B	0.042	8.0		0.060	6.7	X	0.10	15.2		0.22
10	EXC-5	J1V3P6	2/2/15	0.44	UJ	0.44	4.6		0.76	71.7	X	0.087	0.25		0.038	1.1	B	1.1	0.080	B	0.047	15.2		0.066	6.5	X	0.11	16.1		0.25
11	EXC-6	J1V3P7	2/2/15	0.55	JB	0.39	4.6		0.67	66.8	X	0.077	0.22		0.034	1.3	B	1.0	0.075	B	0.042	12.6		0.059	6.5	X	0.10	15.7		0.22
12	EXC-7	J1V3P8	2/2/15	0.74	J	0.36	2.6		0.63	62.3	X	0.072	0.15	B	0.031	0.98	B	0.93	0.059	B	0.039	7.0		0.055	7.6	X	0.095	15.1		0.21
13	EXC-8	J1V3P9	2/2/15	0.91	J	0.35	2.7		0.61	40.8	X	0.070	0.15	B	0.030	0.90	U	0.90	0.063	B	0.038	6.6		0.053	8.1	X	0.092	16.2		0.20
14	EXC-9	J1V3R0	2/2/15	0.78	J	0.38	3.3		0.66	65.9	X	0.076	0.17	B	0.033	0.98	U	0.98	0.055	B	0.041	8.5		0.058	8.4	X	0.10	16.0		0.22
15	EXC-10	J1V3R1	2/2/15	0.59	J	0.37	2.1		0.65	58.3	X	0.074	0.15	B	0.032	1.0	B	0.96	0.075	B	0.040	7.6		0.057	7.7	X	0.098	15.1		0.21
16	EXC-11	J1V3R2	2/2/15	0.75	J	0.36	1.8		0.62	63.7	X	0.072	0.14	B	0.031	0.92	U	0.92	0.074	B	0.039	6.2		0.055	8.6	X	0.094	14.2		0.20
17	EXC-12	J1V3R3	2/2/15	1.9	JB	1.9	2.0		0.66	51.2	X	0.075	0.20	B	0.16	0.97	U	0.97	0.13	B	0.041	3.9		0.058	11.7	X	0.50	19.1		1.1

18 **Statistical Computation Input Data**

19	Sample	Sample	Sample	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper
20	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
21	EXC-4	J1V3P5/ J1V3R4	2/2/15	0.76	1.5	41.2	0.076	0.43	0.047	3.6	8.8	16.8
22	EXC-1	J1V3P2	2/2/15	0.51	3.8	61.1	0.21	1.4	0.091	13.3	7.0	15.8
23	EXC-2	J1V3P3	2/2/15	0.62	3.6	52.3	0.18	1.9	0.052	9.8	7.1	17.0
24	EXC-3	J1V3P4	2/2/15	0.74	2.8	56.8	0.21	1.9	0.097	8.0	6.7	15.2
25	EXC-5	J1V3P6	2/2/15	0.22	4.6	71.7	0.25	1.1	0.080	15.2	6.5	16.1
26	EXC-6	J1V3P7	2/2/15	0.55	4.6	66.8	0.22	1.3	0.075	12.6	6.5	15.7
27	EXC-7	J1V3P8	2/2/15	0.74	2.6	62.3	0.15	0.98	0.059	7.0	7.6	15.1
28	EXC-8	J1V3P9	2/2/15	0.91	2.7	40.8	0.15	0.45	0.063	6.6	8.1	16.2
29	EXC-9	J1V3R0	2/2/15	0.78	3.3	65.9	0.17	0.49	0.055	8.5	8.4	16.0
30	EXC-10	J1V3R1	2/2/15	0.59	2.1	58.3	0.15	1.0	0.075	7.6	7.7	15.1
31	EXC-11	J1V3R2	2/2/15	0.75	1.8	63.7	0.14	0.46	0.074	6.2	8.6	14.2
32	EXC-12	J1V3R3	2/2/15	1.9	2.0	51.2	0.20	0.49	0.13	3.9	11.7	19.1

33 **Statistical Computations**

34		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper
35	95% UCL based on	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.
36	N	12	12	12	12	12	12	12	12	12
37	% < Detection limit	8%	0%	0%	0%	42%	0%	0%	0%	0%
38	Mean	0.76	3.0	57.7	0.18	0.99	0.075	8.5	7.9	16.0
39	Standard deviation	0.40	1.0	9.7	0.046	0.55	0.023	3.6	1.4	1.2
40	95% UCL on mean	0.95	3.7	63.9	0.20	1.3	0.089	11.4	8.6	16.7
41	Maximum value	1.9	4.6	71.7	0.25	1.9	0.13	15.2	11.7	19.1
42	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	5 GW & River Protection	20 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	320 GW Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection	22.0 River Protection
43	**WAC 173-340 3-PART TEST**									
44	95% UCL > Cleanup Limit?	NA	NA	NA	NA	NO	NA	NA	NA	NA
45	> 10% above Cleanup Limit?	NA	NA	NA	NA	NO	NA	NA	NA	NA
46	Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NO	NA	NA	NA	NA
47	**WAC 173-340 Compliance?**	Because all values are below background (5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (6.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (132 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (1.51 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (0.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (18.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (15.7 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (22.0 mg/kg) the WAC 173-340 3-part test is not required.

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1 **100-D-75:1 Subsite Statistical Calculations**

2 **Verification Data - Excavation**

3	Sample	Sample	Sample	Lead			Manganese			Mercury			Nickel			Vanadium			Zinc			TPH - Diesel Range			TPH - Diesel Range EXT		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	EXC-4	J1V3P5	2/2/15	2.1	B	1.2	297		0.087	0.0056	U	0.0056	11.2		0.11	80.2	X	0.41	42.1		0.35	710	J	690	1000	U	1000
6	Duplicate of J1V3P5	J1V3R4	2/2/15	1.7		0.24	243		0.088	0.0054	U	0.0054	7.9		0.11	57.2	X	0.083	35.3		0.35	680	U	680	1000	U	1000
7	EXC-1	J1V3P2	2/2/15	4.4		0.29	332		0.11	0.0057	U	0.0057	15.5		0.13	47.2	X	0.10	37.2		0.43	2000	J	720	2200	J	1100
8	EXC-2	J1V3P3	2/2/15	3.1		0.28	272		0.10	0.0085	B	0.0057	11.8		0.13	53.5	X	0.096	39.0		0.41	11000		740	13000		1100
9	EXC-3	J1V3P4	2/2/15	5.4		0.28	283		0.10	0.045		0.0054	10.4		0.13	47.9	X	0.097	60.2		0.41	13000		700	16000		1000
10	EXC-5	J1V3P6	2/2/15	4.4		0.31	308		0.11	0.0080	B	0.0059	14.5		0.14	41.6	X	0.11	37.0		0.46	780	U	780	1200	U	1200
11	EXC-6	J1V3P7	2/2/15	4.0		0.28	289		0.10	0.0080	B	0.0059	12.4		0.13	40.7	X	0.096	36.0		0.41	840	J	750	1100	U	1100
12	EXC-7	J1V3P8	2/2/15	3.8		0.26	296		0.095	0.0062	B	0.0058	9.7		0.12	56.8	X	0.090	42.6		0.38	3900	J	720	8500		1100
13	EXC-8	J1V3P9	2/2/15	2.8		0.25	302		0.092	0.0054	U	0.0054	10.4		0.11	65.0	X	0.086	53.9		0.37	7500		690	8200		1000
14	EXC-9	J1V3R0	2/2/15	3.4		0.27	332		0.10	0.0071	B	0.0060	11.2		0.12	59.1	X	0.094	45.4		0.40	2800	J	730	3300	J	1100
15	EXC-10	J1V3R1	2/2/15	3.7		0.26	296		0.098	0.0054	U	0.0054	10.8		0.12	57.4	X	0.092	48.0		0.39	2200	J	670	2100	J	980
16	EXC-11	J1V3R2	2/2/15	4.1		0.25	305		0.094	0.0067	B	0.0056	9.1		0.12	56.6	X	0.089	48.3		0.37	3700	J	680	5300		1000
17	EXC-12	J1V3R3	2/2/15	3.8		1.3	372		0.099	0.0055	U	0.0055	8.8		0.12	90.8	X	0.47	47.3		0.40	1900	J	680	1400	J	1000

18 **Statistical Computation Input Data**

19	Sample	Sample	Sample	Lead	Manganese	Mercury	Nickel	Vanadium	Zinc	TPH - Diesel Range	TPH - Diesel Range EXT
20	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg
21	EXC-4	J1V3P5/ J1V3R4	2/2/15	1.9	270	0.0028	9.6	68.7	38.7	525	500
22	EXC-1	J1V3P2	2/2/15	4.4	332	0.0029	15.5	47.2	37.2	2000	2200
23	EXC-2	J1V3P3	2/2/15	3.1	272	0.0085	11.8	53.5	39.0	11000	13000
24	EXC-3	J1V3P4	2/2/15	5.4	283	0.045	10.4	47.9	60.2	13000	16000
25	EXC-5	J1V3P6	2/2/15	4.4	308	0.0080	14.5	41.6	37.0	390	600
26	EXC-6	J1V3P7	2/2/15	4.0	289	0.0080	12.4	40.7	36.0	840	550
27	EXC-7	J1V3P8	2/2/15	3.8	296	0.0062	9.7	56.8	42.6	3900	8500
28	EXC-8	J1V3P9	2/2/15	2.8	302	0.0027	10.4	65.0	53.9	7500	8200
29	EXC-9	J1V3R0	2/2/15	3.4	332	0.0071	11.2	59.1	45.4	2800	3300
30	EXC-10	J1V3R1	2/2/15	3.7	296	0.0027	10.8	57.4	48.0	2200	2100
31	EXC-11	J1V3R2	2/2/15	4.1	305	0.0067	9.1	56.6	48.3	3700	5300
32	EXC-12	J1V3R3	2/2/15	3.8	372	0.0028	8.8	90.8	47.3	1900	1400

33 **Statistical Computations**

34		Lead	Manganese	Mercury	Nickel	Vanadium	Zinc	TPH - Diesel Range	TPH - Diesel Range EXT
35	95% UCL based on	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.
36	N	12	12	12	12	12	12	12	12
37	% < Detection limit	0%	0%	42%	0%	0%	0%	8%	25%
38	Mean	3.7	305	0.0086	11.2	57.1	44.5	4146	5138
39	Standard deviation	0.89	28.9	0.012	2.1	13.6	7.5	4159	5212
40	95% UCL on mean	4.2	320	0.0140	12.3	65.8	48.7	13435	21362
41	Maximum value	5.4	372	0.045	15.5	90.8	60.2	13000	16000
42	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	10.2 GW & River Protection	512 GW & River Protection	0.33 GW & River Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	200,000 ug/kg DE, GW, & River	200,000 ug/kg DE, GW, & River
43	**WAC 173-340 3-PART TEST**								
44	95% UCL > Cleanup Limit?	NA	NA	NA	NA	NO	NA	NO	NO
45	> 10% above Cleanup Limit?	NA	NA	NA	NA	NO	NA	NO	NO
46	Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NO	NA	NO	NO
47	**WAC 173-340 Compliance?**	Because all values are below background (10.2 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (0.33 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (67.8 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie **Date** 03/31/15 **Calc. No.** 0100D-CA-V0595 **Rev. No.** 0

Project 100-D Area Closure Operations **Job No.** 14655 **Checked** I. B. Berezovskiy **Date** 03/31/15

Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations **Sheet No.** 7 of 16

1 **100-D-75:1 Subsite Maximum Calculations**

2 **Verification Data - Excavation**

3	Sample	Sample	Sample	Aroclor-1260			Phenanthrene			Pyrene		
4	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	EXC-4	J1V3P5	2/2/15	2.6	U	2.6	17	U	17	12	U	12
6	Duplicate of J1V3P5	J1V3R4	2/2/15	2.6	U	2.6	16	U	16	11	U	11
7	EXC-1	J1V3P2	2/2/15	2.9	U	2.9	19	U	19	13	U	13
8	EXC-2	J1V3P3	2/2/15	2.8	U	2.8	18	U	18	13	U	13
9	EXC-3	J1V3P4	2/2/15	46		2.7	18	J	18	19	J	13
10	EXC-5	J1V3P6	2/2/15	3.1	U	3.1	20	U	20	14	U	14
11	EXC-6	J1V3P7	2/2/15	2.9	U	2.9	18	U	18	13	U	13
12	EXC-7	J1V3P8	2/2/15	2.7	U	2.7	19	J	18	23	J	13
13	EXC-8	J1V3P9	2/2/15	3.7	J	2.5	17	U	17	12	U	12
14	EXC-9	J1V3R0	2/2/15	2.9	U	2.9	19	U	19	13	U	13
15	EXC-10	J1V3R1	2/2/15	2.6	U	2.6	17	U	17	12	U	12
16	EXC-11	J1V3R2	2/2/15	2.7	U	2.7	17	U	17	15	J	12
17	EXC-12	J1V3R3	2/2/15	2.6	U	2.6	16	U	16	12	U	12

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19 **Statistical Computations**

20		Aroclor-1260			Phenanthrene			Pyrene		
21	% < Detection limit	83%			83%			75%		
22	Maximum value	46			19			23		
23	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	17 ug/kg	GW & River Protection		240,000 ug/kg	GW Protection		240,000 ug/kg	GW Protection	
24	**3-PART TEST**									
25	Maximum > Cleanup Limit?	YES			NO			NO		
26	> 10% above Cleanup Limit?	NO			NO			NO		
27	Any sample > 2X Cleanup Limit?	YES			NO			NO		
28	**3-Part Test Compliance?**	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.			The data set meets the 3-part test criteria when compared to the most stringent RAG.			The data set meets the 3-part test criteria when compared to the most stringent RAG.		

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Washington Closure Hanford

CALCULATION SHEET

Originator J. D. Skoglie
Project 100-D Area Closure Operations
Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations

Date 03/31/15
Job No. 14655

Calc. No. 0100D-CA-V0595
Checked I. B. Berezovskiy

Rev. No. 0
Date 03/31/15
Sheet No. 8 of 16

1 **100-D-75:1 Subsite Statistical Calculations**

2 **Verification Data - Staging Pile Area**

3	Sample	Sample	Sample	Antimony			Arsenic			Barium			Beryllium			Cadmium			Chromium			Cobalt			Copper			Lead		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	SPA-1	J1V3T8	2/2/15	1.7	U	1.7	2.2		0.59	48.6		0.068	0.22	B	0.15	0.13	B	0.037	3.9	X	0.052	9.9		0.45	16.7		0.97	3.4		1.2
6	Duplicate of J1V3T8	J1V3W0	2/2/15	2.5	B	1.9	2.1		0.68	51.1		0.078	0.27	B	0.17	0.12	B	0.042	4.4	X	0.059	10.0		0.51	17.4		1.1	3.6		1.4
7	SPA-2	J1V3T9	2/2/15	0.66		0.37	2.5		0.63	54.4		0.073	0.16	B	0.032	0.18	B	0.039	5.9	X	0.056	8.6		0.096	16.5		0.21	3.9		0.26
8	SPA-3	J1V3V0	2/2/15	2.0	B	1.9	2.3		0.65	51.0		0.075	0.16	U	0.16	0.15	B	0.040	4.9	X	0.057	11.5		0.49	17.6		1.1	3.6		1.3
9	SPA-4	J1V3V1	2/2/15	1.8	U	1.8	3.4		0.62	38.5		0.071	0.15	U	0.15	0.13	B	0.038	4.7	X	0.054	10.6		0.47	17.6		1.0	3.9		1.3
10	SPA-5	J1V3V2	2/2/15	1.8	U	1.8	1.9		0.63	44.6		0.072	0.25	B	0.16	0.13	B	0.039	4.1	X	0.055	10.2		0.47	17.9		1.0	3.6		1.3
11	SPA-6	J1V3V3	2/2/15	2.3	B	1.8	3.2		0.64	41.8		0.074	0.16	B	0.16	0.12	B	0.040	4.5	X	0.056	10.8		0.49	18.2		1.1	3.3		1.3
12	SPA-7	J1V3V4	2/2/15	2.1	B	1.7	1.9		0.58	45.0		0.067	0.22	B	0.15	0.14	B	0.036	2.9	X	0.051	10.3		0.44	16.9		0.96	3.6		1.2
13	SPA-8	J1V3V5	2/2/15	1.0		0.38	2.2		0.66	43.1		0.076	0.11	B	0.033	0.14	B	0.041	4.1	X	0.058	8.4		0.10	15.1		0.22	2.8		0.27
14	SPA-9	J1V3V6	2/2/15	0.75		0.37	2.4		0.64	46.5		0.073	0.16	B	0.032	0.13	B	0.040	4.4	X	0.056	9.2		0.096	16.5		0.21	2.9		0.26
15	SPA-10	J1V3V7	2/2/15	0.62		0.36	2.6		0.62	44.9		0.071	0.12	B	0.031	0.11	B	0.038	3.3	X	0.054	8.9		0.093	14.9		0.20	2.5		0.25
16	SPA-11	J1V3V8	2/2/15	0.69		0.35	2.1		0.61	51.6		0.070	0.15	B	0.030	0.13	B	0.038	4.9	X	0.053	8.5		0.092	15.6		0.20	3.0		0.25
17	SPA-12	J1V3V9	2/2/15	0.64		0.38	2.8		0.66	47.5		0.076	0.14	B	0.033	0.13	B	0.041	5.7	X	0.058	8.8		0.10	16.7		0.22	3.2		0.27

18 **Statistical Computation Input Data**

19	Sample	Sample	Sample	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead
20	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
21	SPA-1	J1V3T8/ J1V3W0	2/2/15	1.7	2.2	49.9	0.25	0.13	4.2	10.0	17.1	3.5
22	SPA-2	J1V3T9	2/2/15	0.66	2.5	54.4	0.16	0.18	5.9	8.6	16.5	3.9
23	SPA-3	J1V3V0	2/2/15	2.0	2.3	51.0	0.08	0.15	4.9	11.5	17.6	3.6
24	SPA-4	J1V3V1	2/2/15	0.90	3.4	38.5	0.08	0.13	4.7	10.6	17.6	3.9
25	SPA-5	J1V3V2	2/2/15	0.90	1.9	44.6	0.25	0.13	4.1	10.2	17.9	3.6
26	SPA-6	J1V3V3	2/2/15	2.3	3.2	41.8	0.16	0.12	4.5	10.8	18.2	3.3
27	SPA-7	J1V3V4	2/2/15	2.1	1.9	45.0	0.22	0.14	2.9	10.3	16.9	3.6
28	SPA-8	J1V3V5	2/2/15	1.0	2.2	43.1	0.11	0.14	4.1	8.4	15.1	2.8
29	SPA-9	J1V3V6	2/2/15	0.75	2.4	46.5	0.16	0.13	4.4	9.2	16.5	2.9
30	SPA-10	J1V3V7	2/2/15	0.62	2.6	44.9	0.12	0.11	3.3	8.9	14.9	2.5
31	SPA-11	J1V3V8	2/2/15	0.69	2.1	51.6	0.15	0.13	4.9	8.5	15.6	3.0
32	SPA-12	J1V3V9	2/2/15	0.64	2.8	47.5	0.14	0.13	5.7	8.8	16.7	3.2

33 **Statistical Computations**

34		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead
35	95% UCL based on	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.
36	N	12	12	12	12	12	12	12	12	12
37	% < Detection limit	17%	0%	0%	17%	0%	0%	0%	0%	0%
38	Mean	1.2	2.5	46.6	0.16	0.13	4.5	9.6	16.7	3.3
39	Standard deviation	0.64	0.48	4.5	0.058	0.018	0.86	1.0	1.1	0.44
40	95% UCL on mean	1.5	2.7	49.1	0.20	0.14	5.0	10.2	17.3	3.6
41	Maximum value	2.5	3.4	54.4	0.27	0.18	5.9	11.5	18.2	3.9
42	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	5 GW & River Protection	20 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection	22.0 River Protection	10.2 GW & River Protection
43	**WAC 173-340 3-PART TEST**									
44	95% UCL > Cleanup Limit?	NA	NA	NA	NA	NA	NA	NA	NA	NA
45	> 10% above Cleanup Limit?	NA	NA	NA	NA	NA	NA	NA	NA	NA
46	Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NA	NA	NA	NA	NA
47	**WAC 173-340 Compliance?**	Because all values are below background (5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (6.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (132 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (1.51 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (0.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (18.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (15.7 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (22.0 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (10.2 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie **Date** 03/31/15 **Calc. No.** 0100D-CA-V0595 **Rev. No.** 0
Project 100-D Area Closure Operations **Job No.** 14655 **Checked** I. B. Berezovskiy **Date** 03/31/15
Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations **Sheet No.** 9 of 16

1 **100-D-75:1 Subsite Statistical Calculations**

2 **Verification Data - Staging Pile Area**

3	Sample	Sample	Sample	Manganese			Nickel			Vanadium			Zinc			TPH - Diesel Range			TPH - Diesel Range EXT		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	SPA-1	J1V3T8	2/2/15	296		0.090	8.6		0.11	77.3	X	0.42	44.9		0.36	2400	J	690	3000	J	1000
6	Duplicate of J1V3T8	J1V3W0	2/2/15	333		0.10	9.2		0.13	77.7	X	0.48	47.1		0.41	1900	J	710	1800	J	1000
7	SPA-2	J1V3T9	2/2/15	334		0.096	9.8		0.12	68.2	X	0.09	50.2		0.38	5000		680	5900		1000
8	SPA-3	J1V3V0	2/2/15	341		0.098	12.6		0.12	80.0	X	0.46	53.1		0.39	670	U	670	990	U	990
9	SPA-4	J1V3V1	2/2/15	322		0.093	10.0		0.11	82.0	X	0.44	47.9		0.37	2100	J	650	2200	J	960
10	SPA-5	J1V3V2	2/2/15	325		0.095	8.4		0.12	72.9	X	0.45	45.2		0.38	2100	J	700	1900	J	1000
11	SPA-6	J1V3V3	2/2/15	324		0.097	8.8		0.12	82.4	X	0.46	47.4		0.39	1800	J	680	1900	J	1000
12	SPA-7	J1V3V4	2/2/15	284		0.088	7.8		0.11	68.5	X	0.41	44.0		0.35	1600	J	670	1300	J	980
13	SPA-8	J1V3V5	2/2/15	313		0.10	7.9		0.12	65.7	X	0.094	43.5		0.40	1800	J	690	1600	J	1000
14	SPA-9	J1V3V6	2/2/15	319		0.096	8.9		0.12	64.8	X	0.091	44.9		0.38	2200	J	700	2500	J	1000
15	SPA-10	J1V3V7	2/2/15	298		0.093	8.3		0.11	64.5	X	0.088	44.6		0.37	2100	J	710	2000	J	1000
16	SPA-11	J1V3V8	2/2/15	324		0.092	8.9		0.11	67.4	X	0.086	44.6		0.37	2100	J	690	2500	J	1000
17	SPA-12	J1V3V9	2/2/15	313		0.10	9.5		0.12	65.9	X	0.094	47.6		0.40	2600	J	710	3400	J	1000

18 **Statistical Computation Input Data**

19	Sample	Sample	Sample	Manganese	Nickel	Vanadium	Zinc	TPH - Diesel Range	TPH - Diesel Range EXT
20	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg
21	SPA-1	J1V3T8/ J1V3W0	2/2/15	315	8.9	77.5	46.0	2150	2400
22	SPA-2	J1V3T9	2/2/15	334	9.8	68.2	50.2	5000	5900
23	SPA-3	J1V3V0	2/2/15	341	12.6	80.0	53.1	335	495
24	SPA-4	J1V3V1	2/2/15	322	10.0	82.0	47.9	2100	2200
25	SPA-5	J1V3V2	2/2/15	325	8.4	72.9	45.2	2100	1900
26	SPA-6	J1V3V3	2/2/15	324	8.8	82.4	47.4	1800	1900
27	SPA-7	J1V3V4	2/2/15	284	7.8	68.5	44.0	1600	1300
28	SPA-8	J1V3V5	2/2/15	313	7.9	65.7	43.5	1800	1600
29	SPA-9	J1V3V6	2/2/15	319	8.9	64.8	44.9	2200	2500
30	SPA-10	J1V3V7	2/2/15	298	8.3	64.5	44.6	2100	2000
31	SPA-11	J1V3V8	2/2/15	324	8.9	67.4	44.6	2100	2500
32	SPA-12	J1V3V9	2/2/15	313	9.5	65.9	47.6	2600	3400

33 **Statistical Computations**

34		Manganese	Nickel	Vanadium	Zinc	TPH - Diesel Range	TPH - Diesel Range EXT
35	95% UCL based on	Large data set (n≥ 10), use MTCAStat lognormal distribution.	Large data set (n≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n≥ 10), lognormal and normal distribution rejected, use z-statistic.
36	N	12	12	12	12	12	12
37	% < Detection limit	0%	0%	0%	0%	8%	8%
38	Mean	318	9.2	71.7	46.6	2157	2341
39	Standard deviation	15.2	1.3	7.0	2.8	1052	1328
40	95% UCL on mean	326	9.8	75.0	48.0	2657	2972
41	Maximum value	341	12.6	82.4	53.1	5000	5900
42	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	512 GW & River Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	200,000 ug/kg DE, GW, & River	200,000 ug/kg DE, GW, & River
43	**WAC 173-340 3-PART TEST**						
44	95% UCL > Cleanup Limit?	NA	NA	NA	NA	NO	NO
45	> 10% above Cleanup Limit?	NA	NA	NA	NA	NO	NO
46	Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NO	NO
47	**WAC 173-340 Compliance?**	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (85.1 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (67.8 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie **Date** 03/31/15 **Calc. No.** 0100D-CA-V0595 **Rev. No.** 0

Project 100-D Area Closure Operations **Job No.** 14655 **Checked** I. B. Berezovskiy **Date** 03/31/15

Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations **Sheet No.** 10 of 16

1 **100-D-75:1 Subsite Maximum Calculations**

2 **Verification Data - Staging Pile Area**

3	Sample	Sample	Sample	Mercury			Aroclor-1260		
4	Area	Number	Date	mg/kg	Q	PQL	ug/kg	Q	PQL
5	SPA-1	J1V3T8	2/2/15	0.0055	U	0.0055	2.7	U	2.7
6	Duplicate of J1V3T8	J1V3W0	2/2/15	0.0055	U	0.0055	2.7	U	2.7
7	SPA-2	J1V3T9	2/2/15	0.0073	B	0.0057	2.6	U	2.6
8	SPA-3	J1V3V0	2/2/15	0.0054	U	0.0054	2.6	U	2.6
9	SPA-4	J1V3V1	2/2/15	0.0056	U	0.0056	2.7	U	2.7
10	SPA-5	J1V3V2	2/2/15	0.0055	U	0.0055	2.6	U	2.6
11	SPA-6	J1V3V3	2/2/15	0.0054	U	0.0054	2.6	U	2.6
12	SPA-7	J1V3V4	2/2/15	0.0053	U	0.0053	2.7	U	2.7
13	SPA-8	J1V3V5	2/2/15	0.0053	U	0.0053	2.6	U	2.6
14	SPA-9	J1V3V6	2/2/15	0.0055	U	0.0055	2.7	U	2.7
15	SPA-10	J1V3V7	2/2/15	0.0055	U	0.0055	2.7	U	2.7
16	SPA-11	J1V3V8	2/2/15	0.0054	U	0.0054	2.5	U	2.5
17	SPA-12	J1V3V9	2/2/15	0.0053	U	0.0053	3.0	J	2.8

18

19 **Statistical Computations**

20		Mercury			Aroclor-1260		
21	% < Detection limit	92%			92%		
22	Maximum value	0.0073			3.0		
23	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	0.33	GW & River Protection		17 ug/kg	GW & River Protection	
24	**3-PART TEST**						
25	Maximum > Cleanup Limit?	NA			NO		
26	> 10% above Cleanup Limit?	NA			NO		
27	Any sample > 2X Cleanup Limit?	NA			NO		
28	**3-Part Test Compliance?**	Because all values are below background (0.33 mg/kg) the WAC 173-340 3-part test is not required.			The data set meets the 3-part test criteria when compared to the most stringent RAG.		

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CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	**Date**	03/31/15	**Calc. No.**	0100D-CA-V0595
Project	100-D Area Closure Operations	**Job No.**	14655	**Checked**	I. B. Berezovskiy
Subject	100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations				

Rev. No. 0
Date 03/31/15
Sheet No. 11 of 16

Ecology Software (MTCAStat) Results, 100-D-75:1 Subsite Excavation

Antimony 95% UCL Calculation

DATA	ID
0.76	J1V3P5/ J1V3R4
0.51	J1V3P2
0.62	J1V3P3
0.74	J1V3P4
0.22	J1V3P6
0.55	J1V3P7
0.74	J1V3P8
0.91	J1V3P9
0.78	J1V3R0
0.59	J1V3R1
0.75	J1V3R2
1.9	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.76
Censored		Lognormal mean	0.76
Detection limit or PQL		Std. devn.	0.40
Method detection limit		Median	0.74
TOTAL	12	Min.	0.22
		Max.	1.9

Lognormal distribution? r-squared is: 0.830
Normal distribution? r-squared is: 0.703
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.95

Arsenic 95% UCL Calculation

DATA	ID
1.5	J1V3P5/ J1V3R4
3.8	J1V3P2
3.6	J1V3P3
2.8	J1V3P4
4.6	J1V3P6
4.6	J1V3P7
2.6	J1V3P8
2.7	J1V3P9
3.3	J1V3R0
2.1	J1V3R1
1.8	J1V3R2
2.0	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	3.0
Censored		Lognormal mean	3.0
Detection limit or PQL		Std. devn.	1.0
Method detection limit		Median	2.8
TOTAL	12	Min.	1.5
		Max.	4.6

Lognormal distribution? r-squared is: 0.975
Normal distribution? r-squared is: 0.959
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 3.7

Barium 95% UCL Calculation

DATA	ID
41.2	J1V3P5/ J1V3R4
61.1	J1V3P2
52.3	J1V3P3
56.8	J1V3P4
71.7	J1V3P6
66.8	J1V3P7
62.3	J1V3P8
40.8	J1V3P9
65.9	J1V3R0
58.3	J1V3R1
63.7	J1V3R2
51.2	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	57.7
Censored		Lognormal mean	57.8
Detection limit or PQL		Std. devn.	9.7
Method detection limit		Median	59.7
TOTAL	12	Min.	40.8
		Max.	71.7

Lognormal distribution? r-squared is: 0.910
Normal distribution? r-squared is: 0.946
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 63.9

Beryllium 95% UCL Calculation

DATA	ID
0.076	J1V3P5/ J1V3R4
0.21	J1V3P2
0.18	J1V3P3
0.21	J1V3P4
0.25	J1V3P6
0.22	J1V3P7
0.15	J1V3P8
0.15	J1V3P9
0.17	J1V3R0
0.15	J1V3R1
0.14	J1V3R2
0.20	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.18
Censored		Lognormal mean	0.18
Detection limit or PQL		Std. devn.	0.046
Method detection limit		Median	0.18
TOTAL	12	Min.	0.076
		Max.	0.25

Lognormal distribution? r-squared is: 0.849
Normal distribution? r-squared is: 0.944
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 0.20

Boron 95% UCL Calculation

DATA	ID
0.43	J1V3P5/ J1V3R4
1.4	J1V3P2
1.9	J1V3P3
1.9	J1V3P4
1.1	J1V3P6
1.3	J1V3P7
0.98	J1V3P8
0.45	J1V3P9
0.49	J1V3R0
1.0	J1V3R1
0.46	J1V3R2
0.49	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.99
Censored		Lognormal mean	1.0
Detection limit or PQL		Std. devn.	0.55
Method detection limit		Median	0.99
TOTAL	12	Min.	0.43
		Max.	1.9

Lognormal distribution? r-squared is: 0.889
Normal distribution? r-squared is: 0.886
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 1.3

Cadmium 95% UCL Calculation

DATA	ID
0.047	J1V3P5/ J1V3R4
0.091	J1V3P2
0.052	J1V3P3
0.097	J1V3P4
0.080	J1V3P6
0.075	J1V3P7
0.059	J1V3P8
0.063	J1V3P9
0.055	J1V3R0
0.075	J1V3R1
0.074	J1V3R2
0.13	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.075
Censored		Lognormal mean	0.075
Detection limit or PQL		Std. devn.	0.023
Method detection limit		Median	0.075
TOTAL	12	Min.	0.047
		Max.	0.13

Lognormal distribution? r-squared is: 0.969
Normal distribution? r-squared is: 0.903
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.089

Chromium 95% UCL Calculation

DATA	ID
3.6	J1V3P5/ J1V3R4
13.3	J1V3P2
9.8	J1V3P3
8.0	J1V3P4
15.2	J1V3P6
12.6	J1V3P7
7.0	J1V3P8
6.6	J1V3P9
8.5	J1V3R0
7.6	J1V3R1
6.2	J1V3R2
3.9	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	8.5
Censored		Lognormal mean	8.6
Detection limit or PQL		Std. devn.	3.6
Method detection limit		Median	7.8
TOTAL	12	Min.	3.6
		Max.	15.2

Lognormal distribution? r-squared is: 0.962
Normal distribution? r-squared is: 0.951
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.4

Cobalt 95% UCL Calculation

DATA	ID
8.8	J1V3P5/ J1V3R4
7.0	J1V3P2
7.1	J1V3P3
6.7	J1V3P4
6.5	J1V3P6
6.5	J1V3P7
7.6	J1V3P8
8.1	J1V3P9
8.4	J1V3R0
7.7	J1V3R1
8.6	J1V3R2
11.7	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	7.9
Censored		Lognormal mean	7.9
Detection limit or PQL		Std. devn.	1.4
Method detection limit		Median	7.7
TOTAL	12	Min.	6.5
		Max.	11.7

Lognormal distribution? r-squared is: 0.882
Normal distribution? r-squared is: 0.817
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 8.6

Copper 95% UCL Calculation

DATA	ID
16.8	J1V3P5/ J1V3R4
15.8	J1V3P2
17.0	J1V3P3
15.2	J1V3P4
16.1	J1V3P6
15.7	J1V3P7
15.1	J1V3P8
16.2	J1V3P9
16.0	J1V3R0
15.1	J1V3R1
14.2	J1V3R2
19.1	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	16.0
Censored		Lognormal mean	16.0
Detection limit or PQL		Std. devn.	1.2
Method detection limit		Median	15.9
TOTAL	12	Min.	14.2
		Max.	19.1

Lognormal distribution? r-squared is: 0.908
Normal distribution? r-squared is: 0.883
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 16.7

CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	**Date**	03/31/15	**Calc. No.**	0100D-CA-V0595
Project	100-D Area Closure Operations	**Job No.**	14655	**Checked**	I. B. Berezovskiy
Subject	100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations				

Rev. No. 0
Date 03/31/15
Sheet No. 12 of 16

Ecology Software (MTCAStat) Results, 100-D-75:1 Subsite Excavation

Lead 95% UCL Calculation

DATA	ID
1.9	J1V3P5/ J1V3R4
4.4	J1V3P2
3.1	J1V3P3
5.4	J1V3P4
4.4	J1V3P6
4.0	J1V3P7
3.8	J1V3P8
2.8	J1V3P9
3.4	J1V3R0
3.7	J1V3R1
4.1	J1V3R2
3.8	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	3.7
Censored		Lognormal mean	3.8
Detection limit or PQL		Std. devn.	0.89
Method detection limit		Median	3.8
TOTAL	12	Min.	1.9
		Max.	5.4

Lognormal distribution? r-squared is: 0.891
Normal distribution? r-squared is: 0.952
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 4.2

Manganese 95% UCL Calculation

DATA	ID
270	J1V3P5/ J1V3R4
332	J1V3P2
272	J1V3P3
283	J1V3P4
308	J1V3P6
289	J1V3P7
296	J1V3P8
302	J1V3P9
332	J1V3R0
296	J1V3R1
305	J1V3R2
372	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	305
Censored		Lognormal mean	305
Detection limit or PQL		Std. devn.	28.9
Method detection limit		Median	299
TOTAL	12	Min.	270
		Max.	372

Lognormal distribution? r-squared is: 0.928
Normal distribution? r-squared is: 0.903
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 320

Mercury 95% UCL Calculation

DATA	ID
0.0028	J1V3P5/ J1V3R4
0.0029	J1V3P2
0.0085	J1V3P3
0.045	J1V3P4
0.0080	J1V3P6
0.0080	J1V3P7
0.0062	J1V3P8
0.0027	J1V3P9
0.0071	J1V3R0
0.0027	J1V3R1
0.0067	J1V3R2
0.0028	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.0086
Censored		Lognormal mean	0.0080
Detection limit or PQL		Std. devn.	0.012
Method detection limit		Median	0.0065
TOTAL	12	Min.	0.0027
		Max.	0.045

Lognormal distribution? r-squared is: 0.788
Normal distribution? r-squared is: 0.473
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.014

Nickel 95% UCL Calculation

DATA	ID
9.6	J1V3P5/ J1V3R4
15.5	J1V3P2
11.8	J1V3P3
10.4	J1V3P4
14.5	J1V3P6
12.4	J1V3P7
9.7	J1V3P8
10.4	J1V3P9
11.2	J1V3R0
10.8	J1V3R1
9.1	J1V3R2
8.8	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	11.2
Censored		Lognormal mean	11.2
Detection limit or PQL		Std. devn.	2.1
Method detection limit		Median	10.6
TOTAL	12	Min.	8.8
		Max.	15.5

Lognormal distribution? r-squared is: 0.943
Normal distribution? r-squared is: 0.904
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 12.3

Vanadium 95% UCL Calculation

DATA	ID
68.7	J1V3P5/ J1V3R4
47.2	J1V3P2
53.5	J1V3P3
47.9	J1V3P4
41.6	J1V3P6
40.7	J1V3P7
56.8	J1V3P8
65.0	J1V3P9
59.1	J1V3R0
57.4	J1V3R1
56.6	J1V3R2
90.8	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	57.1
Censored		Lognormal mean	57.2
Detection limit or PQL		Std. devn.	13.6
Method detection limit		Median	56.7
TOTAL	12	Min.	40.7
		Max.	90.8

Lognormal distribution? r-squared is: 0.945
Normal distribution? r-squared is: 0.883
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 65.8

Zinc 95% UCL Calculation

DATA	ID
38.7	J1V3P5/ J1V3R4
37.2	J1V3P2
39.0	J1V3P3
60.2	J1V3P4
37.0	J1V3P6
36.0	J1V3P7
42.6	J1V3P8
53.9	J1V3P9
45.4	J1V3R0
48.0	J1V3R1
48.3	J1V3R2
47.3	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	44.5
Censored		Lognormal mean	44.5
Detection limit or PQL		Std. devn.	7.5
Method detection limit		Median	44.0
TOTAL	12	Min.	36.0
		Max.	60.2

Lognormal distribution? r-squared is: 0.941
Normal distribution? r-squared is: 0.921
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 48.7

TPH - Diesel Range 95% UCL Calculation

DATA	ID
525	J1V3P5/ J1V3R4
2000	J1V3P2
11000	J1V3P3
13000	J1V3P4
390	J1V3P6
840	J1V3P7
3900	J1V3P8
7500	J1V3P9
2800	J1V3R0
2200	J1V3R1
3700	J1V3R2
1900	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	4146
Censored		Lognormal mean	4678
Detection limit or PQL		Std. devn.	4159
Method detection limit		Median	2500
TOTAL	12	Min.	390
		Max.	13000

Lognormal distribution? r-squared is: 0.970
Normal distribution? r-squared is: 0.819
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13435

TPH - Diesel Range EXT 95% UCL Calculation

DATA	ID
500	J1V3P5/ J1V3R4
2200	J1V3P2
13000	J1V3P3
16000	J1V3P4
600	J1V3P6
550	J1V3P7
8500	J1V3P8
8200	J1V3P9
3300	J1V3R0
2100	J1V3R1
5300	J1V3R2
1400	J1V3R3

Number of samples		Uncensored values	
Uncensored	12	Mean	5138
Censored		Lognormal mean	6093
Detection limit or PQL		Std. devn.	5212
Method detection limit		Median	2750
TOTAL	12	Min.	500
		Max.	16000

Lognormal distribution? r-squared is: 0.951
Normal distribution? r-squared is: 0.855
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 21362

CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	**Date**	03/31/15	**Calc. No.**	0100D-CA-V0595
Project	100-D Area Closure Operations	**Job No.**	14655	**Checked**	I. B. Berezovskiy
Subject	100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations				

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Sheet No. 13 of 16

Ecology Software (MTCAStat) Results, 100-D-75:1 Subsite Staging Pile Area

Antimony 95% UCL Calculation

DATA	ID
1.7	J1V3T8/ J1V3W0
0.66	J1V3T9
2.0	J1V3V0
0.90	J1V3V1
0.90	J1V3V2
2.3	J1V3V3
2.1	J1V3V4
1.0	J1V3V5
0.75	J1V3V6
0.62	J1V3V7
0.69	J1V3V8
0.64	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	1.2
Censored		Lognormal mean	1.2
Detection limit or PQL		Std. devn.	0.64
Method detection limit		Median	0.90
TOTAL	12	Min.	0.62
		Max.	2.3

Lognormal distribution? r-squared is: 0.870
Normal distribution? r-squared is: 0.820
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 1.5

Arsenic 95% UCL Calculation

DATA	ID
2.2	J1V3T8/ J1V3W0
2.5	J1V3T9
2.3	J1V3V0
3.4	J1V3V1
1.9	J1V3V2
3.2	J1V3V3
1.9	J1V3V4
2.2	J1V3V5
2.4	J1V3V6
2.6	J1V3V7
2.1	J1V3V8
2.8	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	2.5
Censored		Lognormal mean	2.5
Detection limit or PQL		Std. devn.	0.48
Method detection limit		Median	2.4
TOTAL	12	Min.	1.9
		Max.	3.4

Lognormal distribution? r-squared is: 0.958
Normal distribution? r-squared is: 0.927
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 2.7

Barium 95% UCL Calculation

DATA	ID
49.9	J1V3T8/ J1V3W0
54.4	J1V3T9
51.0	J1V3V0
38.5	J1V3V1
44.6	J1V3V2
41.8	J1V3V3
45.0	J1V3V4
43.1	J1V3V5
46.5	J1V3V6
44.9	J1V3V7
51.6	J1V3V8
47.5	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	46.6
Censored		Lognormal mean	46.6
Detection limit or PQL		Std. devn.	4.5
Method detection limit		Median	45.8
TOTAL	12	Min.	38.5
		Max.	54.4

Lognormal distribution? r-squared is: 0.982
Normal distribution? r-squared is: 0.984
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 49.1

Beryllium 95% UCL Calculation

DATA	ID
0.25	J1V3T8/ J1V3W0
0.16	J1V3T9
0.080	J1V3V0
0.075	J1V3V1
0.25	J1V3V2
0.16	J1V3V3
0.22	J1V3V4
0.11	J1V3V5
0.16	J1V3V6
0.12	J1V3V7
0.15	J1V3V8
0.14	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.16
Censored		Lognormal mean	0.16
Detection limit or PQL		Std. devn.	0.058
Method detection limit		Median	0.16
TOTAL	12	Min.	0.075
		Max.	0.25

Lognormal distribution? r-squared is: 0.950
Normal distribution? r-squared is: 0.941
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.20

Cadmium 95% UCL Calculation

DATA	ID
0.13	J1V3T8/ J1V3W0
0.18	J1V3T9
0.15	J1V3V0
0.13	J1V3V1
0.13	J1V3V2
0.12	J1V3V3
0.14	J1V3V4
0.14	J1V3V5
0.13	J1V3V6
0.11	J1V3V7
0.13	J1V3V8
0.13	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.13
Censored		Lognormal mean	0.13
Detection limit or PQL		Std. devn.	0.018
Method detection limit		Median	0.13
TOTAL	12	Min.	0.11
		Max.	0.18

Lognormal distribution? r-squared is: 0.864
Normal distribution? r-squared is: 0.819
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.14

Chromium 95% UCL Calculation

DATA	ID
4.2	J1V3T8/ J1V3W0
5.9	J1V3T9
4.9	J1V3V0
4.7	J1V3V1
4.1	J1V3V2
4.5	J1V3V3
2.9	J1V3V4
4.1	J1V3V5
4.4	J1V3V6
3.3	J1V3V7
4.9	J1V3V8
5.7	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	4.5
Censored		Lognormal mean	4.5
Detection limit or PQL		Std. devn.	0.86
Method detection limit		Median	4.5
TOTAL	12	Min.	2.9
		Max.	5.9

Lognormal distribution? r-squared is: 0.942
Normal distribution? r-squared is: 0.962
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 5.0

Cobalt 95% UCL Calculation

DATA	ID
10.0	J1V3T8/ J1V3W0
8.6	J1V3T9
11.5	J1V3V0
10.6	J1V3V1
10.2	J1V3V2
10.8	J1V3V3
10.3	J1V3V4
8.4	J1V3V5
9.2	J1V3V6
8.9	J1V3V7
8.5	J1V3V8
8.8	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	9.6
Censored		Lognormal mean	9.7
Detection limit or PQL		Std. devn.	1.0
Method detection limit		Median	9.6
TOTAL	12	Min.	8.4
		Max.	11.5

Lognormal distribution? r-squared is: 0.939
Normal distribution? r-squared is: 0.936
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 10.2

Copper 95% UCL Calculation

DATA	ID
17.1	J1V3T8/ J1V3W0
16.5	J1V3T9
17.6	J1V3V0
17.6	J1V3V1
17.9	J1V3V2
18.2	J1V3V3
16.9	J1V3V4
15.1	J1V3V5
16.5	J1V3V6
14.9	J1V3V7
15.6	J1V3V8
16.7	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	16.7
Censored		Lognormal mean	16.7
Detection limit or PQL		Std. devn.	1.1
Method detection limit		Median	16.8
TOTAL	12	Min.	14.9
		Max.	18.2

Lognormal distribution? r-squared is: 0.946
Normal distribution? r-squared is: 0.955
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 17.3

Lead 95% UCL Calculation

DATA	ID
3.5	J1V3T8/ J1V3W0
3.9	J1V3T9
3.6	J1V3V0
3.9	J1V3V1
3.6	J1V3V2
3.3	J1V3V3
3.6	J1V3V4
2.8	J1V3V5
2.9	J1V3V6
2.5	J1V3V7
3.0	J1V3V8
3.2	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	3.3
Censored		Lognormal mean	3.3
Detection limit or PQL		Std. devn.	0.44
Method detection limit		Median	3.4
TOTAL	12	Min.	2.5
		Max.	3.9

Lognormal distribution? r-squared is: 0.944
Normal distribution? r-squared is: 0.957
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 3.6

CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	**Date**	03/31/15	**Calc. No.**	0100D-CA-V0595
Project	100-D Area Closure Operations	**Job No.**	14655	**Checked**	I. B. Berezovskiy
Subject	100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations				

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Date 03/31/15
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Ecology Software (MTCAStat) Results, 100-D-75:1 Subsite Staging Pile Area

Manganese 95% UCL Calculation

DATA	ID
315	J1V3T8/ J1V3W0
334	J1V3T9
341	J1V3V0
322	J1V3V1
325	J1V3V2
324	J1V3V3
284	J1V3V4
313	J1V3V5
319	J1V3V6
298	J1V3V7
324	J1V3V8
313	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	318
Censored		Lognormal mean	318
Detection limit or PQL		Std. devn.	15
Method detection limit		Median	321
TOTAL	12	Min.	284
		Max.	341

Lognormal distribution? r-squared is: 0.908
Normal distribution? r-squared is: 0.921
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 326

Nickel 95% UCL Calculation

DATA	ID
8.9	J1V3T8/ J1V3W0
9.8	J1V3T9
12.6	J1V3V0
10.0	J1V3V1
8.4	J1V3V2
8.8	J1V3V3
7.8	J1V3V4
7.9	J1V3V5
8.9	J1V3V6
8.3	J1V3V7
8.9	J1V3V8
9.5	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	9.2
Censored		Lognormal mean	9.2
Detection limit or PQL		Std. devn.	1.3
Method detection limit		Median	8.9
TOTAL	12	Min.	7.8
		Max.	12.6

Lognormal distribution? r-squared is: 0.860
Normal distribution? r-squared is: 0.803
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 9.8

Vanadium 95% UCL Calculation

DATA	ID
77.5	J1V3T8/ J1V3W0
68.2	J1V3T9
80.0	J1V3V0
82.0	J1V3V1
72.9	J1V3V2
82.4	J1V3V3
68.5	J1V3V4
65.7	J1V3V5
64.8	J1V3V6
64.5	J1V3V7
67.4	J1V3V8
65.9	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	71.7
Censored		Lognormal mean	71.7
Detection limit or PQL		Std. devn.	7.0
Method detection limit		Median	68.4
TOTAL	12	Min.	64.5
		Max.	82.4

Lognormal distribution? r-squared is: 0.877
Normal distribution? r-squared is: 0.869
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 75.0

Zinc 95% UCL Calculation

DATA	ID
46.0	J1V3T8/ J1V3W0
50.2	J1V3T9
53.1	J1V3V0
47.9	J1V3V1
45.2	J1V3V2
47.4	J1V3V3
44.0	J1V3V4
43.5	J1V3V5
44.9	J1V3V6
44.6	J1V3V7
44.6	J1V3V8
47.6	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	46.6
Censored		Lognormal mean	46.6
Detection limit or PQL		Std. devn.	2.8
Method detection limit		Median	45.6
TOTAL	12	Min.	43.5
		Max.	53.1

Lognormal distribution? r-squared is: 0.897
Normal distribution? r-squared is: 0.881
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 48.0

TPH - Diesel Range 95% UCL Calculation

DATA	ID
2150	J1V3T8/ J1V3W0
5000	J1V3T9
335	J1V3V0
2100	J1V3V1
2100	J1V3V2
1800	J1V3V3
1600	J1V3V4
1800	J1V3V5
2200	J1V3V6
2100	J1V3V7
2100	J1V3V8
2600	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	2157
Censored		Lognormal mean	2283
Detection limit or PQL		Std. devn.	1052
Method detection limit		Median	2100
TOTAL	12	Min.	335
		Max.	5000

Lognormal distribution? r-squared is: 0.662
Normal distribution? r-squared is: 0.711
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 2657

TPH - Diesel Range EXT 95% UCL Calculation

DATA	ID
2400	J1V3T8/ J1V3W0
5900	J1V3T9
495	J1V3V0
2200	J1V3V1
1900	J1V3V2
1900	J1V3V3
1300	J1V3V4
1600	J1V3V5
2500	J1V3V6
2000	J1V3V7
2500	J1V3V8
3400	J1V3V9

Number of samples		Uncensored values	
Uncensored	12	Mean	2341
Censored		Lognormal mean	2412
Detection limit or PQL		Std. devn.	1328
Method detection limit		Median	2100
TOTAL	12	Min.	495
		Max.	5900

Lognormal distribution? r-squared is: 0.872
Normal distribution? r-squared is: 0.801
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 2972

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Area Closure Operations
Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations

Date 03/31/15
Job No. 14655

Calc. No. 0100D-CA-V0595
Checked I. B. Berezovskiy

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Date 03/31/15
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Duplicate Analysis - 100-D-75:1 Subsite Excavation

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Cadmium			Calcium			Chromium			Cobalt			Copper		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	4120	X	1.3	1.5		0.57	47.1	X	0.066	0.049	B	0.036	5480	X	12.3	3.8		0.050	10.1	X	0.43	18.2		0.94
Duplicate of J1V3P5	J1V3R4	2/2/15	3580	X	1.4	1.5		0.58	35.3	X	0.067	0.045	B	0.036	5630	X	12.5	3.3		0.051	7.4	X	0.088	15.3		0.19

Analysis:

TDL		5	10	2	0.2	100	1	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	14.0%		28.6%		2.7%			17.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable

Duplicate Analysis - 100-D-75:1 Subsite Excavation

Sampling Area	HEIS Number	Sample Date	Iron			Lead			Magnesium			Manganese			Nickel			Potassium			Silicon			Sodium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	24900	X	3.3	2.1	B	1.2	4350		3.2	297		0.087	11.2		0.11	532		35.7	107	JN	4.9	450		51.3
Duplicate of J1V3P5	J1V3R4	2/2/15	20900	X	3.4	1.7		0.24	3200		3.3	243		0.088	7.9		0.11	451		36.3	90.1	JN	5.0	436		52.2

Analysis:

TDL		5	5	75	5	4	400	2	50
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	17.5%		*30.5%*	20.0%			17.1%	3.2%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 100-D-75:1 Subsite Excavation

Sampling Area	HEIS Number	Sample Date	Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	80.2	X	0.41	42.1		0.35
Duplicate of J1V3P5	J1V3R4	2/2/15	57.2	X	0.083	35.3		0.35

Analysis:

TDL		2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)
	RPD	*33.5%*	17.6%
	Difference > 2 TDL?	Not applicable	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Area Closure Operations
Subject 100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations

Date 03/31/15
Job No. 14655

Calc. No. 0100D-CA-V0595
Checked I. B. Berezovskiy

Rev. No. 0
Date 03/31/15
Sheet No. 16 of 16

Duplicate Analysis - 100-D-75:1 Subsite Staging Pile Area

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Cadmium			Calcium			Chromium			Cobalt		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-1	J1V3T8	2/2/15	4540		1.4	2.2		0.59	48.6		0.068	0.22	B	0.15	0.13	B	0.037	6200		12.6	3.9	X	0.052	9.9		0.45
Duplicate of J1V3T8	J1V3W0	2/2/15	5030		1.6	2.1		0.68	51.1		0.078	0.27	B	0.17	0.12	B	0.042	6560		14.5	4.4	X	0.059	10.0		0.51

Analysis:

TDL		5	10	2	0.5	0.2	100	1	2
Duplicate Analysis	Both > PQL?	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**
	Both >5xTDL?	**Yes (calc RPD)**	No-Stop (acceptable)	**Yes (calc RPD)**	No-Stop (acceptable)	No-Stop (acceptable)	**Yes (calc RPD)**	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	10.2%		5.0%			5.6%		
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	No - acceptable

Duplicate Analysis - 100-D-75:1 Subsite Staging Pile Area

Sampling Area	HEIS Number	Sample Date	Copper			Iron			Lead			Magnesium			Manganese			Nickel			Potassium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-1	J1V3T8	2/2/15	16.7		0.97	24500		3.4	3.4		1.2	4140		3.3	296		0.090	8.6		0.11	676		36.8	122		5.1
Duplicate of J1V3T8	J1V3W0	2/2/15	17.4		1.1	27100		3.9	3.6		1.4	4640		3.8	333		0.10	9.2		0.13	732		42.0	143		5.8

Analysis:

TDL		1	5	5	75	5	4	400	2
Duplicate Analysis	Both > PQL?	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**
	Both >5xTDL?	**Yes (calc RPD)**	**Yes (calc RPD)**	No-Stop (acceptable)	**Yes (calc RPD)**	**Yes (calc RPD)**	No-Stop (acceptable)	No-Stop (acceptable)	**Yes (calc RPD)**
	RPD	4.1%	10.1%		11.4%	11.8%			15.8%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable

Duplicate Analysis - 100-D-75:1 Subsite Staging Pile Area

Sampling Area	HEIS Number	Sample Date	Sodium			Vanadium			Zinc			TPH - Diesel Range			TPH - Diesel Range EXT		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SPA-1	J1V3T8	2/2/15	280		52.9	77.3	X	0.42	44.9		0.36	2400	J	690	3000	J	1000
Duplicate of J1V3T8	J1V3W0	2/2/15	325		60.5	77.7	X	0.48	47.1		0.41	1900	J	710	1800	J	1000

Analysis:

TDL		50	2.5	1	5000	5000
Duplicate Analysis	Both > PQL?	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**
	Both >5xTDL?	**Yes (calc RPD)**	**Yes (calc RPD)**	**Yes (calc RPD)**	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	14.9%	0.5%	4.8%		
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	4120	X	1.3	1.7	UJ	1.7	1.5		0.57	47.1	X	0.066
Duplicate of J1V3P5	J1V3R4	2/2/15	3580	X	1.4	0.66	J	0.34	1.5		0.58	35.3	X	0.067
EXC-1	J1V3P2	2/2/15	6370	X	1.7	0.51	JB	0.41	3.8		0.72	61.1	X	0.083
EXC-2	J1V3P3	2/2/15	5710	X	1.6	0.62	J	0.39	3.6		0.67	52.3	X	0.078
EXC-3	J1V3P4	2/2/15	6330	X	1.6	0.74	J	0.39	2.8		0.68	56.8	X	0.078
EXC-5	J1V3P6	2/2/15	7430	X	1.8	0.44	UJ	0.44	4.6		0.76	71.7	X	0.087
EXC-6	J1V3P7	2/2/15	6800	X	1.6	0.55	JB	0.39	4.6		0.67	66.8	X	0.077
EXC-7	J1V3P8	2/2/15	5700	X	1.5	0.74	J	0.36	2.6		0.63	62.3	X	0.072
EXC-8	J1V3P9	2/2/15	5430	X	1.4	0.91	J	0.35	2.7		0.61	40.8	X	0.070
EXC-9	J1V3R0	2/2/15	6140	X	1.5	0.78	J	0.38	3.3		0.66	65.9	X	0.076
EXC-10	J1V3R1	2/2/15	5580	X	1.5	0.59	J	0.37	2.1		0.65	58.3	X	0.074
EXC-11	J1V3R2	2/2/15	5000	X	1.5	0.75	J	0.36	1.8		0.62	63.7	X	0.072
EXC-12	J1V3R3	2/2/15	4420	X	1.5	1.9	JB	1.9	2.0		0.66	51.2	X	0.075
SPA-1	J1V3T8	2/2/15	4540		1.4	1.7	U	1.7	2.2		0.59	48.6		0.068
Duplicate of J1V3T8	J1V3W0	2/2/15	5030		1.6	2.5	B	1.9	2.1		0.68	51.1		0.078
SPA-2	J1V3T9	2/2/15	5900		1.5	0.66		0.37	2.5		0.63	54.4		0.073
SPA-3	J1V3V0	2/2/15	5040		1.5	2.0	B	1.9	2.3		0.65	51.0		0.075
SPA-4	J1V3V1	2/2/15	4690		1.4	1.8	U	1.8	3.4		0.62	38.5		0.071
SPA-5	J1V3V2	2/2/15	4590		1.5	1.8	U	1.8	1.9		0.63	44.6		0.072
SPA-6	J1V3V3	2/2/15	4910		1.5	2.3	B	1.8	3.2		0.64	41.8		0.074
SPA-7	J1V3V4	2/2/15	3940		1.4	2.1	B	1.7	1.9		0.58	45.0		0.067
SPA-8	J1V3V5	2/2/15	4460		1.5	1.0		0.38	2.2		0.66	43.1		0.076
SPA-9	J1V3V6	2/2/15	4730		1.5	0.75		0.37	2.4		0.64	46.5		0.073
SPA-10	J1V3V7	2/2/15	4240		1.4	0.62		0.36	2.6		0.62	44.9		0.071
SPA-11	J1V3V8	2/2/15	5090		1.4	0.69		0.35	2.1		0.61	51.6		0.070
SPA-12	J1V3V9	2/2/15	5380		1.5	0.64		0.38	2.8		0.66	47.5		0.076
Equipment Blank	J1V3W1	2/2/15	137		1.4	0.34	U	0.34	0.59	U	0.59	1.2		0.068

Grey cells indicate not applicable or data will not be used.

Acronyms and notes apply to all of the tables in this attachment.

Note: Data qualified with B, C, D, J, M, N, and/or X are considered acceptable values.

B = Estimated result. Result is less than the RL, but greater than MDL.

C = Analyte was detected in both the sample and the Associated QC blank, and the sample concentration was ≤ 5x the blank concentration.

EXC = excavation

HEIS = Hanford Environmental Information System

J = estimate

M = Sample duplicate precision not met

MDL = method detection limit

N = recovery exceeds upper or lower control limits.

Attachment	1	Sheet No.	1 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

ND = none detected

PQL = practical quantitation limit

Q = qualifier

RAG = remedial action goal

SPA = staging pile area

U = undetected

X (metals) = Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Beryllium			Boron			Cadmium			Calcium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	0.14	U	0.14	0.85	U	0.85	0.049	B	0.036	5480	X	12.3
Duplicate of J1V3P5	J1V3R4	2/2/15	0.081	B	0.029	0.87	U	0.87	0.045	B	0.036	5630	X	12.5
EXC-1	J1V3P2	2/2/15	0.21	B	0.036	1.4	BM	1.1	0.091	B	0.045	7700	X	15.4
EXC-2	J1V3P3	2/2/15	0.18	B	0.034	1.9	B	1.0	0.052	B	0.042	17400	X	14.4
EXC-3	J1V3P4	2/2/15	0.21		0.034	1.9	B	1.0	0.097	B	0.042	6420	X	14.5
EXC-5	J1V3P6	2/2/15	0.25		0.038	1.1	B	1.1	0.080	B	0.047	13500	X	16.2
EXC-6	J1V3P7	2/2/15	0.22		0.034	1.3	B	1.0	0.075	B	0.042	14200	X	14.4
EXC-7	J1V3P8	2/2/15	0.15	B	0.031	0.98	B	0.93	0.059	B	0.039	5870	X	13.4
EXC-8	J1V3P9	2/2/15	0.15	B	0.030	0.90	U	0.90	0.063	B	0.038	6310	X	13.0
EXC-9	J1V3R0	2/2/15	0.17	B	0.033	0.98	U	0.98	0.055	B	0.041	7960	X	14.0
EXC-10	J1V3R1	2/2/15	0.15	B	0.032	1.0	B	0.96	0.075	B	0.040	6010	X	13.8
EXC-11	J1V3R2	2/2/15	0.14	B	0.031	0.92	U	0.92	0.074	B	0.039	5950	X	13.3
EXC-12	J1V3R3	2/2/15	0.20	B	0.16	0.97	U	0.97	0.13	B	0.041	5080	X	14.0
SPA-1	J1V3T8	2/2/15	0.22	B	0.15	0.88	U	0.88	0.13	B	0.037	6200		12.6
Duplicate of J1V3T8	J1V3W0	2/2/15	0.27	B	0.17	1.0	U	1.0	0.12	B	0.042	6560		14.5
SPA-2	J1V3T9	2/2/15	0.16	B	0.032	0.94	U	0.94	0.18	B	0.039	6790		13.6
SPA-3	J1V3V0	2/2/15	0.16	U	0.16	0.96	U	0.96	0.15	B	0.040	6830		13.9
SPA-4	J1V3V1	2/2/15	0.15	U	0.15	0.92	U	0.92	0.13	B	0.038	6470		13.2
SPA-5	J1V3V2	2/2/15	0.25	B	0.16	0.93	U	0.93	0.13	B	0.039	5090		13.4
SPA-6	J1V3V3	2/2/15	0.16	B	0.16	0.95	U	0.95	0.12	B	0.040	6610		13.7
SPA-7	J1V3V4	2/2/15	0.22	B	0.15	0.86	U	0.86	0.14	B	0.036	5810		12.4
SPA-8	J1V3V5	2/2/15	0.11	B	0.033	0.98	U	0.98	0.14	B	0.041	6870		14.0
SPA-9	J1V3V6	2/2/15	0.16	B	0.032	0.94	U	0.94	0.13	B	0.040	7890		13.6
SPA-10	J1V3V7	2/2/15	0.12	B	0.031	0.92	U	0.92	0.11	B	0.038	6090		13.2
SPA-11	J1V3V8	2/2/15	0.15	B	0.030	0.90	U	0.90	0.13	B	0.038	6490		13.0
SPA-12	J1V3V9	2/2/15	0.14	B	0.033	0.98	U	0.98	0.13	B	0.041	7020		14.1
Equipment Blank	J1V3W1	2/2/15	0.066	B	0.029	0.88	U	0.88	0.037	U	0.037	36.2	BC	12.6

Sample Location	HEIS Number	Sample Date	Chromium			Cobalt			Copper			Iron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	3.8		0.050	10.1	X	0.43	18.2		0.94	24900	X	3.3
Duplicate of J1V3P5	J1V3R4	2/2/15	3.3		0.051	7.4	X	0.088	15.3		0.19	20900	X	3.4
EXC-1	J1V3P2	2/2/15	13.3		0.063	7.0	X	0.11	15.8		0.24	20000	X	4.1
EXC-2	J1V3P3	2/2/15	9.8		0.059	7.1	X	0.10	17.0		0.22	21200	X	3.9
EXC-3	J1V3P4	2/2/15	8.0		0.060	6.7	X	0.10	15.2		0.22	19000	X	3.9
EXC-5	J1V3P6	2/2/15	15.2		0.066	6.5	X	0.11	16.1		0.25	18500	X	4.4
EXC-6	J1V3P7	2/2/15	12.6		0.059	6.5	X	0.10	15.7		0.22	17300	X	3.9
EXC-7	J1V3P8	2/2/15	7.0		0.055	7.6	X	0.095	15.1		0.21	22400	X	3.6
EXC-8	J1V3P9	2/2/15	6.6		0.053	8.1	X	0.092	16.2		0.20	23800	X	3.5
EXC-9	J1V3R0	2/2/15	8.5		0.058	8.4	X	0.10	16.0		0.22	23500	X	3.8
EXC-10	J1V3R1	2/2/15	7.6		0.057	7.7	X	0.098	15.1		0.21	21900	X	3.7
EXC-11	J1V3R2	2/2/15	6.2		0.055	8.6	X	0.094	14.2		0.20	23700	X	3.6
EXC-12	J1V3R3	2/2/15	3.9		0.058	11.7	X	0.50	19.1		1.1	26800	X	3.8
SPA-1	J1V3T8	2/2/15	3.9	X	0.052	9.9		0.45	16.7		0.97	24500		3.4
Duplicate of J1V3T8	J1V3W0	2/2/15	4.4	X	0.059	10.0		0.51	17.4		1.1	27100		3.9
SPA-2	J1V3T9	2/2/15	5.9	X	0.056	8.6		0.096	16.5		0.21	26000		3.7
SPA-3	J1V3V0	2/2/15	4.9	X	0.057	11.5		0.49	17.6		1.1	27700		3.7
SPA-4	J1V3V1	2/2/15	4.7	X	0.054	10.6		0.47	17.6		1.0	27600		3.6
SPA-5	J1V3V2	2/2/15	4.1	X	0.055	10.2		0.47	17.9		1.0	25700		3.6
SPA-6	J1V3V3	2/2/15	4.5	X	0.056	10.8		0.49	18.2		1.1	27800		3.7
SPA-7	J1V3V4	2/2/15	2.9	X	0.051	10.3		0.44	16.9		0.96	24200		3.3
SPA-8	J1V3V5	2/2/15	4.1	X	0.058	8.4		0.10	15.1		0.22	24700		3.8
SPA-9	J1V3V6	2/2/15	4.4	X	0.056	9.2		0.096	16.5		0.21	25600		3.7
SPA-10	J1V3V7	2/2/15	3.3	X	0.054	8.9		0.093	14.9		0.20	24800		3.6
SPA-11	J1V3V8	2/2/15	4.9	X	0.053	8.5		0.092	15.6		0.20	26000		3.5
SPA-12	J1V3V9	2/2/15	5.7	X	0.058	8.8		0.10	16.7		0.22	25900		3.8
Equipment Blank	J1V3W1	2/2/15	0.20	X	0.052	0.089	U	0.089	0.61	BC	0.19	678		3.4

Attachment	1	Sheet No.	2 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Lead			Magnesium			Manganese			Mercury		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	2.1	B	1.2	4350		3.2	297		0.087	0.0056	U	0.0056
Duplicate of J1V3P5	J1V3R4	2/2/15	1.7		0.24	3200		3.3	243		0.088	0.0054	U	0.0054
EXC-1	J1V3P2	2/2/15	4.4		0.29	4920		4.0	332		0.11	0.0057	U	0.0057
EXC-2	J1V3P3	2/2/15	3.1		0.28	4700		3.8	272		0.10	0.0085	B	0.0057
EXC-3	J1V3P4	2/2/15	5.4		0.28	3900		3.8	283		0.10	0.045		0.0054
EXC-5	J1V3P6	2/2/15	4.4		0.31	5210		4.2	308		0.11	0.0080	B	0.0059
EXC-6	J1V3P7	2/2/15	4.0		0.28	5080		3.8	289		0.10	0.0080	B	0.0059
EXC-7	J1V3P8	2/2/15	3.8		0.26	4140		3.5	296		0.095	0.0062	B	0.0058
EXC-8	J1V3P9	2/2/15	2.8		0.25	5040		3.4	302		0.092	0.0054	U	0.0054
EXC-9	J1V3R0	2/2/15	3.4		0.27	5120		3.7	332		0.10	0.0071	B	0.0060
EXC-10	J1V3R1	2/2/15	3.7		0.26	4340		3.6	296		0.098	0.0054	U	0.0054
EXC-11	J1V3R2	2/2/15	4.1		0.25	4720		3.5	305		0.094	0.0067	B	0.0056
EXC-12	J1V3R3	2/2/15	3.8		1.3	4290		3.7	372		0.099	0.0055	U	0.0055
SPA-1	J1V3T8	2/2/15	3.4		1.2	4140		3.3	296		0.090	0.0055	U	0.0055
Duplicate of J1V3T8	J1V3W0	2/2/15	3.6		1.4	4640		3.8	333		0.10	0.0055	U	0.0055
SPA-2	J1V3T9	2/2/15	3.9		0.26	4750		3.6	334		0.096	0.0073	B	0.0057
SPA-3	J1V3V0	2/2/15	3.6		1.3	5160		3.6	341		0.098	0.0054	U	0.0054
SPA-4	J1V3V1	2/2/15	3.9		1.3	4710		3.5	322		0.093	0.0056	U	0.0056
SPA-5	J1V3V2	2/2/15	3.6		1.3	4350		3.5	325		0.095	0.0055	U	0.0055
SPA-6	J1V3V3	2/2/15	3.3		1.3	4520		3.6	324		0.097	0.0054	U	0.0054
SPA-7	J1V3V4	2/2/15	3.6		1.2	4220		3.3	284		0.088	0.0053	U	0.0053
SPA-8	J1V3V5	2/2/15	2.8		0.27	4160		3.7	313		0.10	0.0053	U	0.0053
SPA-9	J1V3V6	2/2/15	2.9		0.26	4500		3.6	319		0.096	0.0055	U	0.0055
SPA-10	J1V3V7	2/2/15	2.5		0.25	4120		3.5	298		0.093	0.0055	U	0.0055
SPA-11	J1V3V8	2/2/15	3.0		0.25	4590		3.4	324		0.092	0.0054	U	0.0054
SPA-12	J1V3V9	2/2/15	3.2		0.27	4670		3.7	313		0.10	0.0053	U	0.0053
Equipment Blank	J1V3W1	2/2/15	0.31	B	0.24	28.3		3.3	3.2		0.089	0.0049	U	0.0049

Sample Location	HEIS Number	Sample Date	Molybdenum			Nickel			Potassium			Selenium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	0.23	U	0.23	11.2		0.11	532		35.7	0.75	U	0.75
Duplicate of J1V3P5	J1V3R4	2/2/15	0.23	U	0.23	7.9		0.11	451		36.3	0.76	U	0.76
EXC-1	J1V3P2	2/2/15	0.28	U	0.28	15.5		0.13	900		44.6	0.94	U	0.94
EXC-2	J1V3P3	2/2/15	0.27	U	0.27	11.8		0.13	705		41.9	0.88	U	0.88
EXC-3	J1V3P4	2/2/15	0.27	U	0.27	10.4		0.13	967		42.3	0.89	U	0.89
EXC-5	J1V3P6	2/2/15	0.30	U	0.30	14.5		0.14	968		47.0	0.99	U	0.99
EXC-6	J1V3P7	2/2/15	0.26	U	0.26	12.4		0.13	939		41.8	0.88	U	0.88
EXC-7	J1V3P8	2/2/15	0.25	U	0.25	9.7		0.12	937		39.1	0.82	U	0.82
EXC-8	J1V3P9	2/2/15	0.24	U	0.24	10.4		0.11	619		37.7	0.79	U	0.79
EXC-9	J1V3R0	2/2/15	0.26	U	0.26	11.2		0.12	864		40.9	0.86	U	0.86
EXC-10	J1V3R1	2/2/15	0.25	U	0.25	10.8		0.12	793		40.1	0.84	U	0.84
EXC-11	J1V3R2	2/2/15	0.24	U	0.24	9.1		0.12	805		38.6	0.81	U	0.81
EXC-12	J1V3R3	2/2/15	0.26	U	0.26	8.8		0.12	532		40.7	0.85	U	0.85
SPA-1	J1V3T8	2/2/15	0.23	U	0.23	8.6		0.11	676		36.8	0.77	U	0.77
Duplicate of J1V3T8	J1V3W0	2/2/15	0.27	U	0.27	9.2		0.13	732		42.0	0.88	U	0.88
SPA-2	J1V3T9	2/2/15	0.25	U	0.25	9.8		0.12	931		39.4	0.83	U	0.83
SPA-3	J1V3V0	2/2/15	0.26	U	0.26	12.6		0.12	701		40.3	0.85	U	0.85
SPA-4	J1V3V1	2/2/15	0.24	U	0.24	10.0		0.11	655		38.3	0.80	U	0.80
SPA-5	J1V3V2	2/2/15	0.25	U	0.25	8.4		0.12	617		38.9	0.82	U	0.82
SPA-6	J1V3V3	2/2/15	0.25	U	0.25	8.8		0.12	758		39.8	0.84	U	0.84
SPA-7	J1V3V4	2/2/15	0.23	U	0.23	7.8		0.11	633		36.1	0.76	U	0.76
SPA-8	J1V3V5	2/2/15	0.26	U	0.26	7.9		0.12	701		40.8	0.86	U	0.86
SPA-9	J1V3V6	2/2/15	0.25	U	0.25	8.9		0.12	699		39.5	0.83	U	0.83
SPA-10	J1V3V7	2/2/15	0.24	U	0.24	8.3		0.11	642		38.3	0.80	U	0.80
SPA-11	J1V3V8	2/2/15	0.24	U	0.24	8.9		0.11	763		37.7	0.79	U	0.79
SPA-12	J1V3V9	2/2/15	0.26	U	0.26	9.5		0.12	812		41.0	0.86	U	0.86
Equipment Blank	J1V3W1	2/2/15	0.23	U	0.23	0.32	B	0.11	50.8	B	36.6	0.77	U	0.77

Attachment	1	Sheet No.	3 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Silicon			Silver			Sodium			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-4	J1V3P5	2/2/15	107	JN	4.9	0.14	U	0.14	450		51.3	80.2	X	0.41
Duplicate of J1V3P5	J1V3R4	2/2/15	90.1	JN	5.0	0.14	U	0.14	436		52.2	57.2	X	0.083
EXC-1	J1V3P2	2/2/15	182	JN	6.2	0.17	U	0.17	204		64.2	47.2	X	0.10
EXC-2	J1V3P3	2/2/15	165	JN	5.8	0.16	U	0.16	244		60.3	53.5	X	0.096
EXC-3	J1V3P4	2/2/15	196	JN	5.8	0.16	U	0.16	303		60.8	47.9	X	0.097
EXC-5	J1V3P6	2/2/15	223	JN	6.5	0.18	U	0.18	211		67.6	41.6	X	0.11
EXC-6	J1V3P7	2/2/15	187	JN	5.8	0.16	U	0.16	214		60.1	40.7	X	0.096
EXC-7	J1V3P8	2/2/15	189	JN	5.4	0.15	U	0.15	256		56.3	56.8	X	0.090
EXC-8	J1V3P9	2/2/15	131	JN	5.2	0.15	U	0.15	296		54.3	65.0	X	0.086
EXC-9	J1V3R0	2/2/15	148	JN	5.6	0.16	U	0.16	264		58.8	59.1	X	0.094
EXC-10	J1V3R1	2/2/15	145	JN	5.5	0.16	U	0.16	287		57.8	57.4	X	0.092
EXC-11	J1V3R2	2/2/15	154	JN	5.3	0.15	U	0.15	265		55.6	56.6	X	0.089
EXC-12	J1V3R3	2/2/15	121	JN	5.6	0.16	U	0.16	280		58.6	90.8	X	0.47
SPA-1	J1V3T8	2/2/15	122		5.1	0.14	U	0.14	280		52.9	77.3	X	0.42
Duplicate of J1V3T8	J1V3W0	2/2/15	143		5.8	0.16	U	0.16	325		60.5	77.7	X	0.48
SPA-2	J1V3T9	2/2/15	164		5.4	0.15	U	0.15	302		56.7	68.2	X	0.09
SPA-3	J1V3V0	2/2/15	133		5.6	0.16	U	0.16	367		58.0	80.0	X	0.46
SPA-4	J1V3V1	2/2/15	141		5.3	0.15	U	0.15	371		55.1	82.0	X	0.44
SPA-5	J1V3V2	2/2/15	119		5.4	0.15	U	0.15	276		56.0	72.9	X	0.45
SPA-6	J1V3V3	2/2/15	121		5.5	0.16	U	0.16	360		57.3	82.4	X	0.46
SPA-7	J1V3V4	2/2/15	118		5.0	0.14	U	0.14	307		52.0	68.5	X	0.41
SPA-8	J1V3V5	2/2/15	146		5.6	0.16	U	0.16	315		58.8	65.7	X	0.094
SPA-9	J1V3V6	2/2/15	131		5.5	0.15	U	0.15	270		56.9	64.8	X	0.091
SPA-10	J1V3V7	2/2/15	136		5.3	0.15	U	0.15	345		55.1	64.5	X	0.088
SPA-11	J1V3V8	2/2/15	138		5.2	0.15	U	0.15	346		54.3	67.4	X	0.086
SPA-12	J1V3V9	2/2/15	156		5.7	0.16	U	0.16	342		59.0	65.9	X	0.094
Equipment Blank	J1V3W1	2/2/15	94.7		5.1	0.14	U	0.14	52.7	U	52.7	0.54	BX	0.084

Sample Location	HEIS Number	Sample Date	Zinc			TPH - Diesel Range			TPH - Diesel Range EXT			Percent moisture (wet sample)		
			mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	%	Q	PQL
EXC-4	J1V3P5	2/2/15	42.1		0.35	710	J	690	1000	U	1000	3.4		0.10
Duplicate of J1V3P5	J1V3R4	2/2/15	35.3		0.35	680	U	680	1000	U	1000	3.4		0.10
EXC-1	J1V3P2	2/2/15	37.2		0.43	2000	J	720	2200	J	1100	9.1		0.10
EXC-2	J1V3P3	2/2/15	39.0		0.41	11000		740	13000		1100	9.5		0.10
EXC-3	J1V3P4	2/2/15	60.2		0.41	13000		700	16000		1000	6.7		0.10
EXC-5	J1V3P6	2/2/15	37.0		0.46	780	U	780	1200	U	1200	17.7		0.10
EXC-6	J1V3P7	2/2/15	36.0		0.41	840	J	750	1100	U	1100	13.9		0.10
EXC-7	J1V3P8	2/2/15	42.6		0.38	3900	J	720	8500		1100	7.2		0.10
EXC-8	J1V3P9	2/2/15	53.9		0.37	7500		690	8200		1000	4.6		0.10
EXC-9	J1V3R0	2/2/15	45.4		0.40	2800	J	730	3300	J	1100	9.6		0.10
EXC-10	J1V3R1	2/2/15	48.0		0.39	2200	J	670	2100	J	980	6.3		0.10
EXC-11	J1V3R2	2/2/15	48.3		0.37	3700	J	680	5300		1000	5.2		0.10
EXC-12	J1V3R3	2/2/15	47.3		0.40	1900	J	680	1400	J	1000	4.1		0.10
SPA-1	J1V3T8	2/2/15	44.9		0.36	2400	J	690	3000	J	1000	4.7		0.10
Duplicate of J1V3T8	J1V3W0	2/2/15	47.1		0.41	1900	J	710	1800	J	1000	5.3		0.10
SPA-2	J1V3T9	2/2/15	50.2		0.38	5000		680	5900		1000	6.3		0.10
SPA-3	J1V3V0	2/2/15	53.1		0.39	670	U	670	990	U	990	5.0		0.10
SPA-4	J1V3V1	2/2/15	47.9		0.37	2100	J	650	2200	J	960	5.3		0.10
SPA-5	J1V3V2	2/2/15	45.2		0.38	2100	J	700	1900	J	1000	5.1		0.10
SPA-6	J1V3V3	2/2/15	47.4		0.39	1800	J	680	1900	J	1000	4.7		0.10
SPA-7	J1V3V4	2/2/15	44.0		0.35	1600	J	670	1300	J	980	4.6		0.10
SPA-8	J1V3V5	2/2/15	43.5		0.40	1800	J	690	1600	J	1000	5.3		0.10
SPA-9	J1V3V6	2/2/15	44.9		0.38	2200	J	700	2500	J	1000	5.7		0.10
SPA-10	J1V3V7	2/2/15	44.6		0.37	2100	J	710	2000	J	1000	5.3		0.10
SPA-11	J1V3V8	2/2/15	44.6		0.37	2100	J	690	2500	J	1000	7.1		0.10
SPA-12	J1V3V9	2/2/15	47.6		0.40	2600	J	710	3400	J	1000	7.4		0.10
Equipment Blank	J1V3W1	2/2/15	1.0	C	0.36							0.10	U	0.10

Attachment	1	Sheet No.	4 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-4 - J1V3P5			Duplicate of J1V3P5 - J1V3R4			EXC-1 - J1V3P2			EXC-2 - J1V3P3		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.8	U	2.8	2.8	U	2.8	3.0	U	3.0	3.0	U	3.0
Aroclor-1221	PCB	8.0	U	8.0	8.1	U	8.1	8.8	U	8.8	8.7	U	8.7
Aroclor-1232	PCB	2.0	U	2.0	2.0	U	2.0	2.2	U	2.2	2.2	U	2.2
Aroclor-1242	PCB	4.6	U	4.6	4.7	U	4.7	5.1	U	5.1	5.1	U	5.1
Aroclor-1248	PCB	4.6	U	4.6	4.7	U	4.7	5.1	U	5.1	5.1	U	5.1
Aroclor-1254	PCB	2.6	U	2.6	2.6	U	2.6	2.9	U	2.9	2.8	U	2.8
Aroclor-1260	PCB	2.6	U	2.6	2.6	U	2.6	2.9	U	2.9	2.8	U	2.8

CONSTITUENT	CLASS	EXC-3 - J1V3P4			EXC-5 - J1V3P6			EXC-6 - J1V3P7			EXC-7 - J1V3P8		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.9	U	2.9	3.3	U	3.3	3.1	U	3.1	2.9	U	2.9
Aroclor-1221	PCB	8.4	U	8.4	9.5	U	9.5	9.1	U	9.1	8.3	U	8.3
Aroclor-1232	PCB	2.1	U	2.1	2.4	U	2.4	2.3	U	2.3	2.1	U	2.1
Aroclor-1242	PCB	4.9	U	4.9	5.5	U	5.5	5.3	U	5.3	4.8	U	4.8
Aroclor-1248	PCB	4.9	U	4.9	5.5	U	5.5	5.3	U	5.3	4.8	U	4.8
Aroclor-1254	PCB	2.7	U	2.7	3.1	U	3.1	2.9	U	2.9	2.7	U	2.7
Aroclor-1260	PCB	46		2.7	3.1	U	3.1	2.9	U	2.9	2.7	U	2.7

CONSTITUENT	CLASS	EXC-8 - J1V3P9			EXC-9 - J1V3R0			EXC-10 - J1V3R1			EXC-11 - J1V3R2		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.7	U	2.7	3.1	U	3.1	2.8	U	2.8	2.9	U	2.9
Aroclor-1221	PCB	7.9	U	7.9	8.8	U	8.8	8.1	U	8.1	8.3	U	8.3
Aroclor-1232	PCB	2.0	U	2.0	2.2	U	2.2	2.0	U	2.0	2.1	U	2.1
Aroclor-1242	PCB	4.6	U	4.6	5.1	U	5.1	4.7	U	4.7	4.9	U	4.9
Aroclor-1248	PCB	4.6	U	4.6	5.1	U	5.1	4.7	U	4.7	4.9	U	4.9
Aroclor-1254	PCB	2.5	U	2.5	2.9	U	2.9	2.6	U	2.6	2.7	U	2.7
Aroclor-1260	PCB	3.7	J	2.5	2.9	U	2.9	2.6	U	2.6	2.7	U	2.7

CONSTITUENT	CLASS	EXC-12 - J1V3R3			SPA-1 - J1V3T8			Duplicate of J1V3T8 - J1V3W0			SPA-2 - J1V3T9		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.8	U	2.8	2.9	U	2.9	2.8	U	2.8	2.8	U	2.8
Aroclor-1221	PCB	8.0	U	8.0	8.4	U	8.4	8.2	U	8.2	8.1	U	8.1
Aroclor-1232	PCB	2.0	U	2.0	2.1	U	2.1	2.1	U	2.1	2.0	U	2.0
Aroclor-1242	PCB	4.6	U	4.6	4.9	U	4.9	4.8	U	4.8	4.7	U	4.7
Aroclor-1248	PCB	4.6	U	4.6	4.9	U	4.9	4.8	U	4.8	4.7	U	4.7
Aroclor-1254	PCB	2.6	U	2.6	2.7	U	2.7	2.7	U	2.7	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	2.7	U	2.7	2.7	U	2.7	2.6	U	2.6

Attachment	1	Sheet No.	5 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-3 - J1V3V0			SPA-4 - J1V3V1			SPA-5 - J1V3V2			SPA-6 - J1V3V3		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.8	U	2.8	2.9	U	2.9	2.8	U	2.8	2.8	U	2.8
Aroclor-1221	PCB	8.1	U	8.1	8.3	U	8.3	8.1	U	8.1	8.1	U	8.1
Aroclor-1232	PCB	2.0	U	2.0	2.1	U	2.1	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.7	U	4.7	4.8	U	4.8	4.7	U	4.7	4.7	U	4.7
Aroclor-1248	PCB	4.7	U	4.7	4.8	U	4.8	4.7	U	4.7	4.7	U	4.7
Aroclor-1254	PCB	2.6	U	2.6	2.7	U	2.7	2.6	U	2.6	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	2.7	U	2.7	2.6	U	2.6	2.6	U	2.6

CONSTITUENT	CLASS	SPA-7 - J1V3V4			SPA-8 - J1V3V5			SPA9 - J1V3V6			SPA-10 - J1V3V7		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.9	U	2.9	2.7	U	2.7	2.9	U	2.9	2.8	U	2.8
Aroclor-1221	PCB	8.4	U	8.4	7.9	U	7.9	8.3	U	8.3	8.2	U	8.2
Aroclor-1232	PCB	2.1	U	2.1	2.0	U	2.0	2.1	U	2.1	2.1	U	2.1
Aroclor-1242	PCB	4.9	U	4.9	4.6	U	4.6	4.8	U	4.8	4.8	U	4.8
Aroclor-1248	PCB	4.9	U	4.9	4.6	U	4.6	4.8	U	4.8	4.8	U	4.8
Aroclor-1254	PCB	2.7	U	2.7	2.6	U	2.6	2.7	U	2.7	2.7	U	2.7
Aroclor-1260	PCB	2.7	U	2.7	2.6	U	2.6	2.7	U	2.7	2.7	U	2.7

CONSTITUENT	CLASS	SPA-11 - J1V3V8			SPA-12 - J1V3V9		
		2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.7	U	2.7	2.9	U	2.9
Aroclor-1221	PCB	7.8	U	7.8	8.5	U	8.5
Aroclor-1232	PCB	2.0	U	2.0	2.1	U	2.1
Aroclor-1242	PCB	4.6	U	4.6	4.9	U	4.9
Aroclor-1248	PCB	4.6	U	4.6	4.9	U	4.9
Aroclor-1254	PCB	2.5	U	2.5	2.8	U	2.8
Aroclor-1260	PCB	2.5	U	2.5	3.0	J	2.8

Attachment	1	Sheet No.	6 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-4 - J1V3P5			Duplicate of J1V3P5 - J1V3R4			EXC-1 - J1V3P2			EXC-2 - J1V3P3		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	28	U	28	26	U	26	31	U	31	29	U	29
1,2-Dichlorobenzene	SVOA	22	U	22	21	U	21	24	U	24	23	U	23
1,3-Dichlorobenzene	SVOA	12	U	12	11	U	11	13	U	13	13	U	13
1,4-Dichlorobenzene	SVOA	14	U	14	13	U	13	15	U	15	14	U	14
2,4,5-Trichlorophenol	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
2,4,6-Trichlorophenol	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
2,4-Dichlorophenol	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
2,4-Dimethylphenol	SVOA	66	U	66	62	U	62	72	U	72	69	U	69
2,4-Dinitrophenol	SVOA	330	U	330	310	U	310	360	U	360	350	U	350
2,4-Dinitrotoluene	SVOA	66	U	66	62	U	62	72	U	72	69	U	69
2,6-Dinitrotoluene	SVOA	28	U	28	26	U	26	31	U	31	29	U	29
2-Chloronaphthalene	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
2-Chlorophenol	SVOA	21	U	21	20	U	20	23	U	23	22	U	22
2-Methylnaphthalene	SVOA	19	U	19	18	U	18	21	U	21	20	U	20
2-Methylphenol (cresol, o-)	SVOA	13	U	13	12	U	12	14	U	14	14	U	14
2-Nitroaniline	SVOA	50	U	50	47	U	47	55	U	55	53	U	53
2-Nitrophenol	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
3,3'-Dichlorobenzidine	SVOA	90	U	90	85	U	85	98	U	98	95	U	95
3+4 Methylphenol (cresol, m+p)	SVOA	33	U	33	31	U	31	36	U	36	35	U	35
3-Nitroaniline	SVOA	73	U	73	69	U	69	80	U	80	77	U	77
4,6-Dinitro-2-methylphenol	SVOA	330	U	330	310	U	310	360	U	360	350	U	350
4-Bromophenylphenyl ether	SVOA	19	U	19	18	U	18	21	U	21	20	U	20
4-Chloro-3-methylphenol	SVOA	66	U	66	62	U	62	72	U	72	69	U	69
4-Chloroaniline	SVOA	82	U	82	77	U	77	89	U	89	86	U	86
4-Chlorophenylphenyl ether	SVOA	21	U	21	20	U	20	23	U	23	22	U	22
4-Nitroaniline	SVOA	72	U	72	68	U	68	79	U	79	76	U	76
4-Nitrophenol	SVOA	97	U	97	91	U	91	110	U	110	100	U	100
Acenaphthene	SVOA	10	U	10	9.7	U	9.7	11	U	11	11	U	11
Acenaphthylene	SVOA	17	U	17	16	U	16	19	U	19	18	U	18
Anthracene	SVOA	17	U	17	16	U	16	19	U	19	18	U	18
Benzo(a)anthracene	SVOA	20	U	20	19	U	19	22	U	22	21	U	21
Benzo(a)pyrene	SVOA	20	U	20	19	U	19	22	U	22	21	U	21
Benzo(b)fluoranthene	SVOA	26	U	26	25	U	25	29	U	29	28	U	28
Benzo(ghi)perylene	SVOA	16	U	16	15	U	15	17	U	17	17	U	17
Benzo(k)fluoranthene	SVOA	40	U	40	38	U	38	44	U	44	42	U	42
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	22	U	22	25	U	25	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	22	U	22	25	U	25	24	U	24
Bis(2-chloroethyl) ether	SVOA	17	U	17	16	U	16	18	U	18	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	46	U	46	43	U	43	50	U	50	48	U	48
Butylbenzylphthalate	SVOA	43	U	43	40	U	40	47	U	47	45	U	45
Carbazole	SVOA	36	U	36	34	U	34	39	U	39	38	U	38
Chrysene	SVOA	27	U	27	25	U	25	29	U	29	28	U	28
Dibenz[a,h]anthracene	SVOA	19	U	19	18	U	18	21	U	21	20	U	20
Dibenzofuran	SVOA	20	U	20	19	U	19	22	U	22	21	U	21
Diethyl phthalate	SVOA	26	U	26	24	U	24	28	U	28	27	U	27
Dimethyl phthalate	SVOA	23	U	23	22	U	22	25	U	25	24	U	24
Di-n-butylphthalate	SVOA	29	U	29	27	U	27	32	U	32	31	U	31
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	16	U	16	15	U	15
Fluoranthene	SVOA	36	U	36	34	U	34	39	U	39	38	U	38
Fluorene	SVOA	18	U	18	17	U	17	20	U	20	19	U	19
Hexachlorobenzene	SVOA	29	U	29	27	U	27	32	U	32	31	U	31
Hexachlorobutadiene	SVOA	10	U	10	9.4	U	9.4	11	U	11	11	U	11
Hexachlorocyclopentadiene	SVOA	50	U	50	47	U	47	55	U	55	53	U	53
Hexachloroethane	SVOA	21	U	21	20	U	20	23	U	23	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	21	U	21	24	U	24	23	U	23
Isophorone	SVOA	17	U	17	16	U	16	19	U	19	18	U	18
Naphthalene	SVOA	31	U	31	29	U	29	34	U	34	33	U	33
Nitrobenzene	SVOA	22	U	22	21	U	21	24	U	24	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	31	U	31	29	U	29	34	U	34	33	U	33
N-Nitrosodiphenylamine	SVOA	21	U	21	20	U	20	23	U	23	22	U	22
Pentachlorophenol	SVOA	330	U	330	310	U	310	360	U	360	350	U	350
Phenanthrene	SVOA	17	U	17	16	U	16	19	U	19	18	U	18
Phenol	SVOA	18	U	18	17	U	17	20	U	20	19	U	19
Pyrene	SVOA	12	U	12	11	U	11	13	U	13	13	U	13

Attachment	1	Sheet No.	7 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-3 - J1V3P4			EXC-5 - J1V3P6			EXC-6 - J1V3P7			EXC-7 - J1V3P8		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	29	U	29	33	U	33	30	U	30	29	U	29
1,2-Dichlorobenzene	SVOA	23	U	23	26	U	26	23	U	23	23	U	23
1,3-Dichlorobenzene	SVOA	13	U	13	14	U	14	13	U	13	13	U	13
1,4-Dichlorobenzene	SVOA	14	U	14	16	U	16	14	U	14	14	U	14
2,4,5-Trichlorophenol	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
2,4,6-Trichlorophenol	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
2,4-Dichlorophenol	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
2,4-Dimethylphenol	SVOA	69	U	69	77	U	77	70	U	70	69	U	69
2,4-Dinitrophenol	SVOA	350	U	350	390	U	390	350	U	350	350	U	350
2,4-Dinitrotoluene	SVOA	69	U	69	77	U	77	70	U	70	69	U	69
2,6-Dinitrotoluene	SVOA	29	U	29	33	U	33	30	U	30	29	U	29
2-Chloronaphthalene	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
2-Chlorophenol	SVOA	22	U	22	25	U	25	22	U	22	22	U	22
2-Methylnaphthalene	SVOA	20	U	20	22	U	22	20	U	20	20	U	20
2-Methylphenol (cresol, o-)	SVOA	14	U	14	15	U	15	14	U	14	14	U	14
2-Nitroaniline	SVOA	52	U	52	59	U	59	53	U	53	52	U	52
2-Nitrophenol	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
3,3'-Dichlorobenzidine	SVOA	94	U	94	110	U	110	95	U	95	94	U	94
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	39	U	39	35	U	35	34	U	34
3-Nitroaniline	SVOA	76	U	76	86	U	86	77	U	77	76	U	76
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	390	U	390	350	U	350	340	U	340
4-Bromophenylphenyl ether	SVOA	20	U	20	22	U	22	20	U	20	20	U	20
4-Chloro-3-methylphenol	SVOA	69	U	69	77	U	77	70	U	70	69	U	69
4-Chloroaniline	SVOA	86	U	86	96	U	96	86	U	86	85	U	85
4-Chlorophenylphenyl ether	SVOA	22	U	22	25	U	25	22	U	22	22	U	22
4-Nitroaniline	SVOA	76	U	76	85	U	85	77	U	77	76	U	76
4-Nitrophenol	SVOA	100	U	100	110	U	110	100	U	100	100	U	100
Acenaphthene	SVOA	11	U	11	12	U	12	11	U	11	11	U	11
Acenaphthylene	SVOA	18	U	18	20	U	20	18	U	18	18	U	18
Anthracene	SVOA	18	U	18	20	U	20	18	U	18	18	U	18
Benzo(a)anthracene	SVOA	21	U	21	23	U	23	21	U	21	21	U	21
Benzo(a)pyrene	SVOA	21	U	21	23	U	23	21	U	21	21	U	21
Benzo(b)fluoranthene	SVOA	27	U	27	31	U	31	28	U	28	27	U	27
Benzo(ghi)perylene	SVOA	17	U	17	19	U	19	17	U	17	17	U	17
Benzo(k)fluoranthene	SVOA	42	U	42	47	U	47	42	U	42	42	U	42
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	27	U	27	24	U	24	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	27	U	27	24	U	24	24	U	24
Bis(2-chloroethyl) ether	SVOA	17	U	17	19	U	19	18	U	18	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	54	U	54	49	U	49	48	U	48
Butylbenzylphthalate	SVOA	45	U	45	50	U	50	45	U	45	45	U	45
Carbazole	SVOA	38	U	38	42	U	42	38	U	38	38	U	38
Chrysene	SVOA	28	U	28	32	U	32	29	U	29	28	U	28
Dibenz[a,h]anthracene	SVOA	20	U	20	22	U	22	20	U	20	20	U	20
Dibenzofuran	SVOA	21	U	21	23	U	23	21	U	21	21	U	21
Diethyl phthalate	SVOA	27	U	27	30	U	30	27	U	27	27	U	27
Dimethyl phthalate	SVOA	24	U	24	27	U	27	24	U	24	24	U	24
Di-n-butylphthalate	SVOA	30	U	30	34	U	34	31	U	31	30	U	30
Di-n-octylphthalate	SVOA	15	U	15	17	U	17	15	U	15	15	U	15
Fluoranthene	SVOA	38	U	38	42	U	42	38	U	38	38	U	38
Fluorene	SVOA	19	U	19	21	U	21	19	U	19	19	U	19
Hexachlorobenzene	SVOA	30	U	30	34	U	34	31	U	31	30	U	30
Hexachlorobutadiene	SVOA	10	U	10	12	U	12	11	U	11	10	U	10
Hexachlorocyclopentadiene	SVOA	52	U	52	59	U	59	53	U	53	52	U	52
Hexachloroethane	SVOA	22	U	22	25	U	25	22	U	22	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	26	U	26	23	U	23	23	U	23
Isophorone	SVOA	18	U	18	20	U	20	18	U	18	18	U	18
Naphthalene	SVOA	32	U	32	36	U	36	33	U	33	32	U	32
Nitrobenzene	SVOA	23	U	23	26	U	26	23	U	23	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	36	U	36	33	U	33	32	U	32
N-Nitrosodiphenylamine	SVOA	22	U	22	25	U	25	22	U	22	22	U	22
Pentachlorophenol	SVOA	340	U	340	390	U	390	350	U	350	340	U	340
Phenanthrene	SVOA	18	J	18	20	U	20	18	U	18	19	J	18
Phenol	SVOA	19	U	19	21	U	21	19	U	19	19	U	19
Pyrene	SVOA	19	J	13	14	U	14	13	U	13	23	J	13

Attachment	1	Sheet No.	8 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-8 - J1V3P9			EXC-9 - J1V3R0			EXC-10 - J1V3R1			EXC-11 - J1V3R2		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	28	U	28	31	U	31	28	U	28	29	U	29
1,2-Dichlorobenzene	SVOA	22	U	22	24	U	24	22	U	22	23	U	23
1,3-Dichlorobenzene	SVOA	12	U	12	13	U	13	12	U	12	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	15	U	15	13	U	13	14	U	14
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
2,4-Dichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
2,4-Dimethylphenol	SVOA	65	U	65	73	U	73	65	U	65	68	U	68
2,4-Dinitrophenol	SVOA	330	U	330	370	U	370	330	U	330	340	U	340
2,4-Dinitrotoluene	SVOA	65	U	65	73	U	73	65	U	65	68	U	68
2,6-Dinitrotoluene	SVOA	28	U	28	31	U	31	28	U	28	29	U	29
2-Chloronaphthalene	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
2-Chlorophenol	SVOA	21	U	21	23	U	23	21	U	21	22	U	22
2-Methylnaphthalene	SVOA	19	U	19	21	U	21	19	U	19	20	U	20
2-Methylphenol (cresol, o-)	SVOA	13	U	13	14	U	14	13	U	13	13	U	13
2-Nitroaniline	SVOA	49	U	49	55	U	55	49	U	49	51	U	51
2-Nitrophenol	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
3,3'-Dichlorobenzidine	SVOA	88	U	88	99	U	99	89	U	89	92	U	92
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	36	U	36	33	U	33	34	U	34
3-Nitroaniline	SVOA	72	U	72	80	U	80	72	U	72	75	U	75
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	360	U	360	330	U	330	340	U	340
4-Bromophenylphenyl ether	SVOA	19	U	19	21	U	21	19	U	19	20	U	20
4-Chloro-3-methylphenol	SVOA	65	U	65	73	U	73	65	U	65	68	U	68
4-Chloroaniline	SVOA	81	U	81	90	U	90	81	U	81	84	U	84
4-Chlorophenylphenyl ether	SVOA	21	U	21	23	U	23	21	U	21	22	U	22
4-Nitroaniline	SVOA	71	U	71	80	U	80	71	U	71	74	U	74
4-Nitrophenol	SVOA	95	U	95	110	U	110	96	U	96	100	U	100
Acenaphthene	SVOA	10	U	10	11	U	11	10	U	10	11	U	11
Acenaphthylene	SVOA	17	U	17	19	U	19	17	U	17	17	U	17
Anthracene	SVOA	17	U	17	19	U	19	17	U	17	17	U	17
Benzo(a)anthracene	SVOA	20	U	20	22	U	22	20	U	20	21	U	21
Benzo(a)pyrene	SVOA	20	U	20	22	U	22	20	U	20	21	U	21
Benzo(b)fluoranthene	SVOA	26	U	26	29	U	29	26	U	26	27	U	27
Benzo(ghi)perylene	SVOA	16	U	16	18	U	18	16	U	16	16	U	16
Benzo(k)fluoranthene	SVOA	39	U	39	44	U	44	39	U	39	41	U	41
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	25	U	25	23	U	23	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	25	U	25	23	U	23	24	U	24
Bis(2-chloroethyl) ether	SVOA	16	U	16	18	U	18	16	U	16	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	45	U	45	51	U	51	45	U	45	47	U	47
Butylbenzylphthalate	SVOA	42	U	42	47	U	47	42	U	42	44	U	44
Carbazole	SVOA	35	U	35	40	U	40	35	U	35	37	U	37
Chrysene	SVOA	27	U	27	30	U	30	27	U	27	28	U	28
Dibenz[a,h]anthracene	SVOA	19	U	19	21	U	21	19	U	19	20	U	20
Dibenzofuran	SVOA	20	U	20	22	U	22	20	U	20	21	U	21
Diethyl phthalate	SVOA	26	U	26	29	U	29	26	U	26	27	U	27
Dimethyl phthalate	SVOA	23	U	23	25	U	25	23	U	23	24	U	24
Di-n-butylphthalate	SVOA	29	U	29	32	U	32	29	U	29	30	U	30
Di-n-octylphthalate	SVOA	14	U	14	16	U	16	14	U	14	15	U	15
Fluoranthene	SVOA	35	U	35	40	U	40	35	U	35	37	U	37
Fluorene	SVOA	18	U	18	20	U	20	18	U	18	18	U	18
Hexachlorobenzene	SVOA	29	U	29	32	U	32	29	U	29	30	U	30
Hexachlorobutadiene	SVOA	9.8	U	9.8	11	U	11	9.9	U	9.9	10	U	10
Hexachlorocyclopentadiene	SVOA	49	U	49	55	U	55	49	U	49	51	U	51
Hexachloroethane	SVOA	21	U	21	23	U	23	21	U	21	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	24	U	24	22	U	22	23	U	23
Isophorone	SVOA	17	U	17	19	U	19	17	U	17	17	U	17
Naphthalene	SVOA	30	U	30	34	U	34	31	U	31	32	U	32
Nitrobenzene	SVOA	22	U	22	24	U	24	22	U	22	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	34	U	34	31	U	31	32	U	32
N-Nitrosodiphenylamine	SVOA	21	U	21	23	U	23	21	U	21	22	U	22
Pentachlorophenol	SVOA	320	U	320	360	U	360	330	U	330	340	U	340
Phenanthrene	SVOA	17	U	17	19	U	19	17	U	17	17	U	17
Phenol	SVOA	18	U	18	20	U	20	18	U	18	18	U	18
Pyrene	SVOA	12	U	12	13	U	13	12	U	12	15	J	12

Attachment	1	Sheet No.	9 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-12 - J1V3R3			SPA-1 - J1V3T8			Duplicate of J1V3T8 - J1V3W0			SPA-2 - J1V3T9		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	27	U	27	29	U	29	29	U	29	28	U	28
1,2-Dichlorobenzene	SVOA	21	U	21	22	U	22	22	U	22	22	U	22
1,3-Dichlorobenzene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	14	U	14	14	U	14	13	U	13
2,4,5-Trichlorophenol	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
2,4,6-Trichlorophenol	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
2,4-Dichlorophenol	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
2,4-Dimethylphenol	SVOA	64	U	64	67	U	67	67	U	67	65	U	65
2,4-Dinitrophenol	SVOA	320	U	320	340	U	340	340	U	340	330	U	330
2,4-Dinitrotoluene	SVOA	64	U	64	67	U	67	67	U	67	65	U	65
2,6-Dinitrotoluene	SVOA	27	U	27	29	U	29	29	U	29	28	U	28
2-Chloronaphthalene	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
2-Chlorophenol	SVOA	20	U	20	21	U	21	21	U	21	21	U	21
2-Methylnaphthalene	SVOA	18	U	18	19	U	19	19	U	19	19	U	19
2-Methylphenol (cresol, o-)	SVOA	13	U	13	13	U	13	13	U	13	13	U	13
2-Nitroaniline	SVOA	48	U	48	51	U	51	51	U	51	49	U	49
2-Nitrophenol	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
3,3'-Dichlorobenzidine	SVOA	87	U	87	92	U	92	92	U	92	88	U	88
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	34	U	34	34	U	34	32	U	32
3-Nitroaniline	SVOA	70	U	70	74	U	74	75	U	75	72	U	72
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	340	U	340	340	U	340	320	U	320
4-Bromophenylphenyl ether	SVOA	18	U	18	19	U	19	19	U	19	19	U	19
4-Chloro-3-methylphenol	SVOA	64	U	64	67	U	67	67	U	67	65	U	65
4-Chloroaniline	SVOA	79	U	79	83	U	83	84	U	84	80	U	80
4-Chlorophenylphenyl ether	SVOA	20	U	20	21	U	21	21	U	21	21	U	21
4-Nitroaniline	SVOA	70	U	70	74	U	74	74	U	74	71	U	71
4-Nitrophenol	SVOA	94	U	94	99	U	99	99	U	99	95	U	95
Acenaphthene	SVOA	9.9	U	9.9	10	U	10	11	U	11	10	U	10
Acenaphthylene	SVOA	16	U	16	17	U	17	17	U	17	17	U	17
Anthracene	SVOA	16	U	16	17	U	17	17	U	17	17	U	17
Benzo(a)anthracene	SVOA	19	U	19	20	U	20	20	U	20	20	U	20
Benzo(a)pyrene	SVOA	19	U	19	20	U	20	20	U	20	20	U	20
Benzo(b)fluoranthene	SVOA	25	U	25	27	U	27	27	U	27	26	U	26
Benzo(ghi)perylene	SVOA	15	U	15	16	U	16	16	U	16	16	U	16
Benzo(k)fluoranthene	SVOA	39	U	39	41	U	41	41	U	41	39	U	39
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	23	U	23	23	U	23	23	U	23
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	23	U	23	23	U	23	23	U	23
Bis(2-chloroethyl) ether	SVOA	16	U	16	17	U	17	17	U	17	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	44	U	44	47	U	47	47	U	47	45	U	45
Butylbenzylphthalate	SVOA	42	U	42	44	U	44	44	U	44	42	U	42
Carbazole	SVOA	35	U	35	37	U	37	37	U	37	35	U	35
Chrysene	SVOA	26	U	26	28	U	28	28	U	28	27	U	27
Dibenz[a,h]anthracene	SVOA	18	U	18	19	U	19	19	U	19	19	U	19
Dibenzofuran	SVOA	19	U	19	20	U	20	20	U	20	20	U	20
Diethyl phthalate	SVOA	25	U	25	26	U	26	27	U	27	26	U	26
Dimethyl phthalate	SVOA	22	U	22	23	U	23	23	U	23	23	U	23
Di-n-butylphthalate	SVOA	28	U	28	30	U	30	30	U	30	28	U	28
Di-n-octylphthalate	SVOA	14	U	14	15	U	15	15	U	15	14	U	14
Fluoranthene	SVOA	35	U	35	37	U	37	37	U	37	35	U	35
Fluorene	SVOA	17	U	17	18	U	18	18	U	18	18	U	18
Hexachlorobenzene	SVOA	28	U	28	30	U	30	30	U	30	28	U	28
Hexachlorobutadiene	SVOA	9.7	U	9.7	10	U	10	10	U	10	9.8	U	9.8
Hexachlorocyclopentadiene	SVOA	48	U	48	51	U	51	51	U	51	49	U	49
Hexachloroethane	SVOA	21	U	21	22	U	22	22	U	22	21	U	21
Indeno(1,2,3-cd)pyrene	SVOA	21	U	21	22	U	22	22	U	22	22	U	22
Isophorone	SVOA	16	U	16	17	U	17	17	U	17	17	U	17
Naphthalene	SVOA	30	U	30	32	U	32	32	U	32	30	U	30
Nitrobenzene	SVOA	21	U	21	22	U	22	22	U	22	22	U	22
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	32	U	32	32	U	32	30	U	30
N-Nitrosodiphenylamine	SVOA	20	U	20	21	U	21	21	U	21	21	U	21
Pentachlorophenol	SVOA	320	U	320	340	U	340	340	U	340	320	U	320
Phenanthrene	SVOA	16	U	16	17	U	17	17	U	17	17	U	17
Phenol	SVOA	17	U	17	18	U	18	18	U	18	18	U	18
Pyrene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12

Attachment	1	Sheet No.	10 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-3 - J1V3V0			SPA-4 - J1V3V1			SPA-5 - J1V3V2			SPA-6 - J1V3V3		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	27	U	27	28	U	28	27	U	27	28	U	28
1,2-Dichlorobenzene	SVOA	22	U	22	22	U	22	21	U	21	22	U	22
1,3-Dichlorobenzene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	14	U	14	13	U	13	14	U	14
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
2,4-Dichlorophenol	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
2,4-Dimethylphenol	SVOA	65	U	65	67	U	67	63	U	63	67	U	67
2,4-Dinitrophenol	SVOA	330	U	330	340	U	340	320	U	320	340	U	340
2,4-Dinitrotoluene	SVOA	65	U	65	67	U	67	63	U	63	67	U	67
2,6-Dinitrotoluene	SVOA	27	U	27	28	U	28	27	U	27	28	U	28
2-Chloronaphthalene	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
2-Chlorophenol	SVOA	21	U	21	21	U	21	20	U	20	21	U	21
2-Methylnaphthalene	SVOA	19	U	19	19	U	19	18	U	18	19	U	19
2-Methylphenol (cresol, o-)	SVOA	13	U	13	13	U	13	12	U	12	13	U	13
2-Nitroaniline	SVOA	49	U	49	50	U	50	48	U	48	50	U	50
2-Nitrophenol	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
3,3'-Dichlorobenzidine	SVOA	88	U	88	91	U	91	86	U	86	91	U	91
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	33	U	33	32	U	32	33	U	33
3-Nitroaniline	SVOA	71	U	71	74	U	74	70	U	70	74	U	74
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	330	U	330	320	U	320	330	U	330
4-Bromophenylphenyl ether	SVOA	19	U	19	19	U	19	18	U	18	19	U	19
4-Chloro-3-methylphenol	SVOA	65	U	65	67	U	67	63	U	63	67	U	67
4-Chloroaniline	SVOA	80	U	80	83	U	83	79	U	79	83	U	83
4-Chlorophenylphenyl ether	SVOA	21	U	21	21	U	21	20	U	20	21	U	21
4-Nitroaniline	SVOA	71	U	71	73	U	73	70	U	70	73	U	73
4-Nitrophenol	SVOA	95	U	95	98	U	98	93	U	93	98	U	98
Acenaphthene	SVOA	10	U	10	10	U	10	9.9	U	9.9	10	U	10
Acenaphthylene	SVOA	17	U	17	17	U	17	16	U	16	17	U	17
Anthracene	SVOA	17	U	17	17	U	17	16	U	16	17	U	17
Benzo(a)anthracene	SVOA	20	U	20	20	U	20	19	U	19	20	U	20
Benzo(a)pyrene	SVOA	20	U	20	20	U	20	19	U	19	20	U	20
Benzo(b)fluoranthene	SVOA	26	U	26	26	U	26	25	U	25	26	U	26
Benzo(ghi)perylene	SVOA	16	U	16	16	U	16	15	U	15	16	U	16
Benzo(k)fluoranthene	SVOA	39	U	39	40	U	40	38	U	38	40	U	40
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	23	U	23	22	U	22	23	U	23
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	23	U	23	22	U	22	23	U	23
Bis(2-chloroethyl) ether	SVOA	16	U	16	17	U	17	16	U	16	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	45	U	45	46	U	46	44	U	44	46	U	46
Butylbenzylphthalate	SVOA	42	U	42	43	U	43	41	U	41	43	U	43
Carbazole	SVOA	35	U	35	36	U	36	35	U	35	36	U	36
Chrysene	SVOA	26	U	26	27	U	27	26	U	26	27	U	27
Dibenz[a,h]anthracene	SVOA	19	U	19	19	U	19	18	U	18	19	U	19
Dibenzofuran	SVOA	20	U	20	20	U	20	19	U	19	20	U	20
Diethyl phthalate	SVOA	25	U	25	26	U	26	25	U	25	26	U	26
Dimethyl phthalate	SVOA	22	U	22	23	U	23	22	U	22	23	U	23
Di-n-butylphthalate	SVOA	28	U	28	29	U	29	28	U	28	29	U	29
Di-n-octylphthalate	SVOA	14	U	14	15	U	15	14	U	14	15	U	15
Fluoranthene	SVOA	35	U	35	36	U	36	35	U	35	36	U	36
Fluorene	SVOA	18	U	18	18	U	18	17	U	17	18	U	18
Hexachlorobenzene	SVOA	28	U	28	29	U	29	28	U	28	29	U	29
Hexachlorobutadiene	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10
Hexachlorocyclopentadiene	SVOA	49	U	49	50	U	50	48	U	48	50	U	50
Hexachloroethane	SVOA	21	U	21	21	U	21	20	U	20	21	U	21
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	22	U	22	21	U	21	22	U	22
Isophorone	SVOA	17	U	17	17	U	17	16	U	16	17	U	17
Naphthalene	SVOA	30	U	30	31	U	31	30	U	30	31	U	31
Nitrobenzene	SVOA	22	U	22	22	U	22	21	U	21	22	U	22
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	31	U	31	30	U	30	31	U	31
N-Nitrosodiphenylamine	SVOA	21	U	21	21	U	21	20	U	20	21	U	21
Pentachlorophenol	SVOA	320	U	320	330	U	330	320	U	320	330	U	330
Phenanthrene	SVOA	17	U	17	17	U	17	16	U	16	17	U	17
Phenol	SVOA	18	U	18	18	U	18	17	U	17	18	U	18
Pyrene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12

Attachment	1	Sheet No.	11 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-7 - J1V3V4			SPA-8 - J1V3V5			SPA9 - J1V3V6			SPA-10 - J1V3V7		
		2/2/15			2/2/15			2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	29	U	29	27	U	27	28	U	28	27	U	27
1,2-Dichlorobenzene	SVOA	23	U	23	22	U	22	22	U	22	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	SVOA	14	U	14	13	U	13	14	U	14	13	U	13
2,4,5-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
2,4,6-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
2,4-Dichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
2,4-Dimethylphenol	SVOA	68	U	68	65	U	65	67	U	67	63	U	63
2,4-Dinitrophenol	SVOA	340	U	340	330	U	330	340	U	340	320	U	320
2,4-Dinitrotoluene	SVOA	68	U	68	65	U	65	67	U	67	63	U	63
2,6-Dinitrotoluene	SVOA	29	U	29	27	U	27	28	U	28	27	U	27
2-Chloronaphthalene	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
2-Chlorophenol	SVOA	22	U	22	21	U	21	21	U	21	20	U	20
2-Methylnaphthalene	SVOA	19	U	19	19	U	19	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	13	U	13	13	U	13	12	U	12
2-Nitroaniline	SVOA	51	U	51	49	U	49	51	U	51	48	U	48
2-Nitrophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
3,3'-Dichlorobenzidine	SVOA	92	U	92	88	U	88	91	U	91	86	U	86
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	32	U	32	34	U	34	32	U	32
3-Nitroaniline	SVOA	75	U	75	71	U	71	74	U	74	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	320	U	320	340	U	340	320	U	320
4-Bromophenylphenyl ether	SVOA	19	U	19	19	U	19	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	68	U	68	65	U	65	67	U	67	63	U	63
4-Chloroaniline	SVOA	84	U	84	80	U	80	83	U	83	79	U	79
4-Chlorophenylphenyl ether	SVOA	22	U	22	21	U	21	21	U	21	20	U	20
4-Nitroaniline	SVOA	74	U	74	71	U	71	74	U	74	70	U	70
4-Nitrophenol	SVOA	99	U	99	95	U	95	99	U	99	93	U	93
Acenaphthene	SVOA	11	U	11	10	U	10	10	U	10	9.9	U	9.9
Acenaphthylene	SVOA	17	U	17	17	U	17	17	U	17	16	U	16
Anthracene	SVOA	17	U	17	17	U	17	17	U	17	16	U	16
Benzo(a)anthracene	SVOA	20	U	20	20	U	20	20	U	20	19	U	19
Benzo(a)pyrene	SVOA	20	U	20	20	U	20	20	U	20	19	U	19
Benzo(b)fluoranthene	SVOA	27	U	27	26	U	26	27	U	27	25	U	25
Benzo(ghi)perylene	SVOA	16	U	16	16	U	16	16	U	16	15	U	15
Benzo(k)fluoranthene	SVOA	41	U	41	39	U	39	41	U	41	38	U	38
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	22	U	22	23	U	23	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	22	U	22	23	U	23	22	U	22
Bis(2-chloroethyl) ether	SVOA	17	U	17	16	U	16	17	U	17	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	47	U	47	45	U	45	47	U	47	44	U	44
Butylbenzylphthalate	SVOA	44	U	44	42	U	42	44	U	44	41	U	41
Carbazole	SVOA	37	U	37	35	U	35	37	U	37	35	U	35
Chrysene	SVOA	28	U	28	26	U	26	27	U	27	26	U	26
Dibenz[a,h]anthracene	SVOA	19	U	19	19	U	19	19	U	19	18	U	18
Dibenzofuran	SVOA	20	U	20	20	U	20	20	U	20	19	U	19
Diethyl phthalate	SVOA	27	U	27	25	U	25	26	U	26	25	U	25
Dimethyl phthalate	SVOA	24	U	24	22	U	22	23	U	23	22	U	22
Di-n-butylphthalate	SVOA	30	U	30	28	U	28	29	U	29	28	U	28
Di-n-octylphthalate	SVOA	15	U	15	14	U	14	15	U	15	14	U	14
Fluoranthene	SVOA	37	U	37	35	U	35	37	U	37	35	U	35
Fluorene	SVOA	18	U	18	18	U	18	18	U	18	17	U	17
Hexachlorobenzene	SVOA	30	U	30	28	U	28	29	U	29	28	U	28
Hexachlorobutadiene	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.6	U	9.6
Hexachlorocyclopentadiene	SVOA	51	U	51	49	U	49	51	U	51	48	U	48
Hexachloroethane	SVOA	22	U	22	21	U	21	22	U	22	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	22	U	22	22	U	22	21	U	21
Isophorone	SVOA	17	U	17	17	U	17	17	U	17	16	U	16
Naphthalene	SVOA	32	U	32	30	U	30	31	U	31	30	U	30
Nitrobenzene	SVOA	23	U	23	22	U	22	22	U	22	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	30	U	30	31	U	31	30	U	30
N-Nitrosodiphenylamine	SVOA	22	U	22	21	U	21	21	U	21	20	U	20
Pentachlorophenol	SVOA	340	U	340	320	U	320	340	U	340	320	U	320
Phenanthrene	SVOA	17	U	17	17	U	17	17	U	17	16	U	16
Phenol	SVOA	18	U	18	18	U	18	18	U	18	17	U	17
Pyrene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12

Attachment	1	Sheet No.	12 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-11 - J1V3V8			SPA-12 - J1V3V9		
		2/2/15			2/2/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	29	U	29	30	U	30
1,2-Dichlorobenzene	SVOA	23	U	23	23	U	23
1,3-Dichlorobenzene	SVOA	12	U	12	13	U	13
1,4-Dichlorobenzene	SVOA	14	U	14	14	U	14
2,4,5-Trichlorophenol	SVOA	10	U	10	11	U	11
2,4,6-Trichlorophenol	SVOA	10	U	10	11	U	11
2,4-Dichlorophenol	SVOA	10	U	10	11	U	11
2,4-Dimethylphenol	SVOA	69	U	69	70	U	70
2,4-Dinitrophenol	SVOA	350	U	350	350	U	350
2,4-Dinitrotoluene	SVOA	69	U	69	70	U	70
2,6-Dinitrotoluene	SVOA	29	U	29	30	U	30
2-Chloronaphthalene	SVOA	10	U	10	11	U	11
2-Chlorophenol	SVOA	22	U	22	22	U	22
2-Methylnaphthalene	SVOA	20	U	20	20	U	20
2-Methylphenol (cresol, o-)	SVOA	13	U	13	14	U	14
2-Nitroaniline	SVOA	52	U	52	53	U	53
2-Nitrophenol	SVOA	10	U	10	11	U	11
3,3'-Dichlorobenzidine	SVOA	93	U	93	95	U	95
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	35	U	35
3-Nitroaniline	SVOA	76	U	76	77	U	77
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	350	U	350
4-Bromophenylphenyl ether	SVOA	20	U	20	20	U	20
4-Chloro-3-methylphenol	SVOA	69	U	69	70	U	70
4-Chloroaniline	SVOA	85	U	85	86	U	86
4-Chlorophenylphenyl ether	SVOA	22	U	22	22	U	22
4-Nitroaniline	SVOA	75	U	75	77	U	77
4-Nitrophenol	SVOA	100	U	100	100	U	100
Acenaphthene	SVOA	11	U	11	11	U	11
Acenaphthylene	SVOA	18	U	18	18	U	18
Anthracene	SVOA	18	U	18	18	U	18
Benzo(a)anthracene	SVOA	21	U	21	21	U	21
Benzo(a)pyrene	SVOA	21	U	21	21	U	21
Benzo(b)fluoranthene	SVOA	27	U	27	28	U	28
Benzo(ghi)perylene	SVOA	17	U	17	17	U	17
Benzo(k)fluoranthene	SVOA	42	U	42	42	U	42
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	24	U	24
Bis(2-chloroethyl) ether	SVOA	17	U	17	18	U	18
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	49	U	49
Butylbenzylphthalate	SVOA	45	U	45	45	U	45
Carbazole	SVOA	37	U	37	38	U	38
Chrysene	SVOA	28	U	28	28	U	28
Dibenz[a,h]anthracene	SVOA	20	U	20	20	U	20
Dibenzofuran	SVOA	21	U	21	21	U	21
Diethyl phthalate	SVOA	27	U	27	27	U	27
Dimethyl phthalate	SVOA	24	U	24	24	U	24
Di-n-butylphthalate	SVOA	30	U	30	31	U	31
Di-n-octylphthalate	SVOA	15	U	15	15	U	15
Fluoranthene	SVOA	37	U	37	38	U	38
Fluorene	SVOA	19	U	19	19	U	19
Hexachlorobenzene	SVOA	30	U	30	31	U	31
Hexachlorobutadiene	SVOA	10	U	10	11	U	11
Hexachlorocyclopentadiene	SVOA	52	U	52	53	U	53
Hexachloroethane	SVOA	22	U	22	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	23	U	23
Isophorone	SVOA	18	U	18	18	U	18
Naphthalene	SVOA	32	U	32	33	U	33
Nitrobenzene	SVOA	23	U	23	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	33	U	33
N-Nitrosodiphenylamine	SVOA	22	U	22	22	U	22
Pentachlorophenol	SVOA	340	U	340	350	U	350
Phenanthrene	SVOA	18	U	18	18	U	18
Phenol	SVOA	19	U	19	19	U	19
Pyrene	SVOA	13	U	13	13	U	13

Attachment	1	Sheet No.	13 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

Attachment 1. 100-D-75:1 Subsite Verification Sample Results (Asbestos).

Sample Location	HEIS Number	Sample Date	Chrysotyle			Amosite			Crocidolite			Tremolite			Actinolite			Anthophyllite		
			%	Q	RDL	%	Q	RDL	%	Q	RDL	%	Q	RDL	%	Q	RDL	%	Q	RDL
EXC-4	J1V3R8	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
Duplicate of J1V3R8	J1V3T7	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-1	J1V3R5	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-2	J1V3R6	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-3	J1V3R7	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-5	J1V3R9	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-6	J1V3T0	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-7	J1V3T1	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-8	J1V3T2	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-9	J1V3T3	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-10	J1V3T4	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-11	J1V3T5	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
EXC-12	J1V3T6	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-1	J1V3W2	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
Duplicate of J1V3W2	J1V3X4	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-2	J1V3W3	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-3	J1V3W4	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-4	J1V3W5	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-5	J1V3W6	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-6	J1V3W7	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-7	J1V3W8	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-8	J1V3W9	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-9	J1V3X0	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-10	J1V3X1	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-11	J1V3X2	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND
SPA-12	J1V3X3	2/2/15	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND	ND	U	ND

Attachment	1	Sheet No.	14 of 14
Originator	J. D. Skoglie	Date	04/06/15
Checked	I. B. Berezovskiy	Job No.	14655
Calc. No.	0100D-CA-V0595	Rev. No.	0

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CALCULATION COVER SHEET

Project Title: 100-D Area Closure Operations **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0596

Subject: 100-D-75:1 Subsite Direct Contact Hazard Quotient and Carcinogenic Risk Calculations

Computer Program: Excel Program No: Excel 2010

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 3 Total = 4	J. D. Skoglie	I. B. Berezovsky	R. J. Nielson	S. G. Wilkinson	6/25/15

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	03/30/15	Calc. No.:	0100D-CA-V0596	Rev.:	0
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	03/30/15
Subject:	100-D-75:1 Subsite Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No.	1 of 3

PURPOSE:

Provide documentation to support the calculation of the direct contact hazard quotient (HQ) and excess carcinogenic risk for the 100-D-75:1 subsite. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) (DOE-RL 2009b), the following criteria must be met:

1) An HQ of <1.0 for all individual noncarcinogens
2) A cumulative HQ of <1.0 for noncarcinogens
3) An excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens
4) A cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.

GIVEN/REFERENCES:

1) DOE-RL, 2009a, *100 Area Remedial Action Sampling and Analysis Plan*, DOE/RL-96-22, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

2) DOE-RL, 2009b, *Remedial Design Report/Remedial Action Work Plan for the 100 Areas,* DOE/RL-96-17, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

3) WAC 173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, 1996.

4) WCH, 2015, *100-D-75:1 Subsite Cleanup Verification 95% UCL Calculation*, 0100D-CA-V0595, Rev. 0, Washington Closure Hanford, Richland, Washington.

SOLUTION:

1) Generate an HQ for each noncarcinogenic constituent detected above background or required detection limit/practical quantitation limit and compare it to the individual HQ of <1.0 (DOE-RL 2009b).

2) Sum the HQs and compare this value to the cumulative HQ of <1.0.

3) Generate an excess cancer risk value for each carcinogenic constituent detected above background or required detection limit/practical quantitation limit and compare it to the excess cancer risk of $<1 \times 10^{-6}$ (DOE-RL 2009b).

4) Sum the excess cancer risk value(s) and compare it to the cumulative cancer risk of $<1 \times 10^{-5}$.

Washington Closure Hanford CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	03/31/15	Calc. No.:	0100D-CA-V0596	Rev.:	0
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	03/31/15
Subject:	100-D-75:1 Subsite Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No.	2 of 3

METHODOLOGY:

The 100-D-75:1 subsite is comprised of two decision units for verification sampling; the excavation and staging pile area. The direct contact hazard quotient and carcinogenic risk calculations for the 100-D-75:1 subsite were conservatively calculated for the entire site using the greater of the statistical or maximum value for each analyte from WCH (2015). Of the contaminants of potential concern (COPCs) for this site, boron, the detected semivolatile organic compounds (SVOCs), and aroclor-1260 require HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Total petroleum hydrocarbons (diesel range extended) were detected, however, the risk associated with total petroleum hydrocarbons do not contribute to the cumulative toxicity calculation. All other site nonradionuclide COPCs were not detected or were quantified below background levels. An example of the HQ and risk calculations is presented below:

1) For example, the maximum value for boron is 1.3 mg/kg, divided by the noncarcinogenic RAG value of 7,200 mg/kg (calculated in accordance with the noncarcinogenic toxics effects formula in WAC 173-340-740[3]), is 1.8×10^{-4}. Comparing this value, and all other individual values, to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation. The sum of the HQ values is 1.9×10^{-4}. Comparing this value to the requirement of <1.0, this criterion is met.

3) To calculate the excess cancer risk, the maximum or statistical value is divided by the carcinogenic RAG value, then multiplied by 1.0×10^{-6}. For example, the statistical value for aroclor-1260 is 0.046 mg/kg; divided by 0.5 mg/kg, and multiplied as indicated, is 9.2×10^{-8}. Comparing this value to the requirement of $<1 \times 10^{-6}$, this criterion is met.

4) After these calculations are completed for the carcinogenic analytes, the cumulative excess cancer risk is obtained by summing the individual values. The excess cancer risk for the carcinogenic constituents detected is 9.2×10^{-8}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this criterion is met.

RESULTS:

1) List individual noncarcinogens and corresponding HQs >1.0: None
2) List the cumulative noncarcinogenic HQ >1.0: None
3) List individual carcinogens and corresponding excess cancer risk $>1 \times 10^{-6}$: None
4) List the cumulative excess cancer risk for carcinogens $>1 \times 10^{-5}$: None

Table 1 shows the results of the calculations.

Washington Closure Hanford CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	03/30/15	Calc. No.:	0100D-CA-V0596	Rev.:	0
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	03/30/15
Subject:	100-D-75:1 Subsite Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No.	3 of 3

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 100-D-86:3 Subsite.

Contaminants of Potential Concern	Maximum or Statistical Value [a] (mg/kg)	Noncarcinogen RAG [b] (mg/kg)	Hazard Quotient	Carcinogen RAG [b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.3	7,200	1.8E-04	--	--
Semivolatiles					
Phenanthrene [c]	0.019	24,000	7.9E-07	--	--
Pyrene	0.023	2,400	9.6E-06	--	--
Polychlorinated Biphenyls					
Aroclor-1260	0.046	--	--	0.5	9.2E-08
Total Petroleum Hydrocarbons					
TPH - diesel range extended [d]	21	200	--	--	--
Totals					
Cumulative Hazard Quotient:			**1.9E-04**		
Cumulative Excess Cancer Risk:					**9.2E-08**

Notes:

[a] = From WCH (2015).

[b] = Value obtained from the RDR/RAWP (DOE-RL 2009b) or *Washington Administrative Code* (WAC) 173-340-740(3), Method B, 1996, unless otherwise noted.

[c] = Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals.

phenanthrene surrogate: anthracene

[d] = The risk associated with total petroleum hydrocarbons do not contribute to the cumulative toxicity calculation.

-- = not applicable

RAG = remedial action goal

CONCLUSION:

The calculations in Table 1 demonstrate that the 100-D-75:1 subsite meets the requirements for the direct contact hazard quotient and carcinogenic (excess cancer) risk, respectively, as identified in the RDR/RAWP (DOE-RL 2009b) and SAP (DOE-RL 2009a). The direct contact hazard quotient and carcinogenic (excess cancer) risk calculations are for use in the RSVP for this site.

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CALCULATION COVER SHEET

Project Title: 100-D Area Closure Operations **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0597

Subject: 100-D-75:1 Subsite Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater

Computer Program: Excel Program No: Excel 2010

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Summary = 3 Total = 4	J. D. Skoglie	I.B. Berezovskiy	R. J. Nielson	S. G. Wilkinson	6/25/15

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	3/31/2015	Calc. No.:	0100D-CA-V0597	Rev.:	1
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	3/31/2015
Subject:	100-D-75:1 Subsite Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 1 of 3	

PURPOSE:

Provide documentation to support the calculation of the hazard quotient (HQ) and excess carcinogenic risk associated with soil contaminant levels compared to soil cleanup levels for protection of groundwater for the 100-D-75:1 subsite. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) (DOE-RL 2009), the following criteria must be met:

1) An HQ of <1.0 for all individual noncarcinogens
2) A cumulative HQ of <1.0 for noncarcinogens
3) An excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens
4) A cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.

GIVEN/REFERENCES:

1) BHI, 2005, *100 Area Analogous Sites RESRAD Evaluation*, Calculation No. 0100X-CA-V0050 Rev 0, Bechtel Hanford, Inc., Richland, Washington.

2) DOE-RL, 2009, *Remedial Design Report/Remedial Action Work Plan for the 100 Areas*, DOE/RL-96-17, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

3) WAC 173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, 1996.

4) WCH, 2015, *100-D-75:1 Subsite Cleanup Verification 95% UCL Calculations*, 0100D-CA-V0595, Rev. 0, Washington Closure Hanford, Inc., Richland, Washington.

SOLUTION:

1) Generate a HQ for each noncarcinogenic constituent detected above background in soil and with a K_d less than that required to show no migration to groundwater in 1,000 years using the RESRAD generic site model (BHI 2005).

2) Sum the HQs and compare this value to the cumulative HQ of <1.0.

3) Generate an excess cancer risk value for each carcinogenic constituent detected above background in soil and with a K_d less than that required to show no migration to groundwater in 1,000 years using the RESRAD generic site model (BHI 2005).

4) Sum the excess cancer risk value(s) and compare it to the cumulative cancer risk of $<1 \times 10^{-5}$.

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	4/2/2015	Calc. No.:	0100D-CA-V0597	Rev.:	1
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	4/2/2015
Subject:	100-D-75:1 Subsite Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 2 of 3	

METHODOLOGY:

The 100-D-75:1 subsite is comprised of two decision units for verification sampling; the excavation and the staging pile area. Hazard quotient and carcinogenic risk calculations for potential impact to groundwater at the 100-D-75:1 subsite were conservatively calculated for the entire waste site using the greater of the statistical or maximum value for each analyte in all decision units from the 95% UCL calculation (WCH 2015). Based on the generic site RESRAD model (BHI 2005) and a vadose zone of approximately 21 m (69 ft) thickness, a K_d of 3.6 mL/g or greater is required to show no predicted migration to groundwater in 1,000 years. Of the contaminants of potential concern (COPCs) for this site, boron is included because no Washington State or Hanford background value has been established and the distribution coefficient is less than that necessary to show no migration to groundwater in 1,000 years using this model. All other site nonradionuclide COPCs were not detected, quantified below background levels, or has a K_d greater than or equal to 3.6 mL/g. An example of the HQ and risk calculations for soil constituents with a potential impact to groundwater is presented below:

1) The hazard quotient is defined as the ratio of the dose of a substance obtained over a specified time (mg/kg/day) to a reference dose for the same substance derived over the same specified time (mg/kg/day). The hazard quotient can also be calculated as the ratio of the concentration in soil (maximum or statistical value) (mg/kg) to the soil RAG (mg/kg) for protection of groundwater, where the RAG is the groundwater cleanup level (mg/L) (calculated with, and related to the hazard quotient through, WAC 173-340-720(3)(a)(ii)(A), 1996) x 100 x 1 mg/1000 mg (conversion factor). This is based on the "100 times rule" of WAC 173-340-740(3)(a)(ii)(A) (1996). For example, the statistical value for boron is 1.3 mg/kg, divided by the noncarcinogenic RAG value of 320 mg/kg is 4.1×10^{-3}. Comparing this value to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. (To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation.) The cumulative HQ for the 100-D-75:1 subsite is 4.1×10^{-3}. Comparing this value to the requirement of <1.0, this criterion is met.

3) To calculate the excess cancer risk, the maximum or statistical value is divided by the carcinogenic RAG value, and then multiplied by 1×10^{-6}. There were not any detected COPCs with a carcinogenic RAG. Therefore, the individual requirement of $<1 \times 10^{-6}$ is met, and the cumulative excess cancer risk for carcinogens of $<1 \times 10^{-5}$ is also met.

4) The soil cleanup RAGs for protection of groundwater are based on the "100 times" provision in WAC 173-340-740(3)(a)(ii)(A). WAC 173-340-740(3)(a)(ii)(A) (1996) provides the "100 times rule" but also states "unless it can be demonstrated that a higher soil concentration is protective of groundwater at the site." When the "100 times rule" values are exceeded, RESRAD was used to demonstrate that higher soil concentrations may be protective of groundwater.

RESULTS:

1) List individual noncarcinogens and corresponding HQs >1.0: None
2) List the cumulative noncarcinogenic HQ >1.0: None
3) List individual carcinogens and corresponding excess cancer risk $>1 \times 10^{-6}$: None

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	4/2/2015	Calc. No.:	0100D-CA-V0597	Rev.:	1
Project:	100-D Area Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	4/2/2015
Subject:	100-D-75:1 Subsite Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 3 of 3	

4) List the cumulative excess cancer risk for carcinogens >1 x 10^{-5}: None.

Table 1 shows the results of the calculations.

Table 1. Hazard Quotient and Excess Cancer Risk Results for the 100-D-75:1 Subsite.

Contaminants of Potential Concern[a]	Statistical Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.3	320	4.1E-03	--	--
Totals					
Cumulative Hazard Quotient:			**4.1E-03**		
Cumulative Excess Cancer Risk:					**0.0E+00**

Notes:

[a] = From WCH (2015).

[b] = Value obtained from the Cleanup Levels and Risk Calculations (CLARC) database using Groundwater, Method B, results and the "100 times" model.

-- = not applicable

RAG = remedial action goal

CONCLUSION:

This calculation demonstrates that the 100-D-75:1 subsite meets the requirements for the hazard quotients and excess carcinogenic risk for protection of groundwater as identified in the RDR/RAWP (DOE-RL 2009).

APPENDIX C

100-D-75:1 SUBSITE IN-PROCESS SAMPLING RESULTS

Table C-1. 100-D-75:1 In-process Sampling Results - Total Petroleum Hydrocarbons (Page 1 of 8).

Sanple Location	HEIS Number	Date	TPH - diesel range			TPH - motor oil (high boiling)		
			TPH			TPH		
			ug/kg	Q	PQL	ug/kg	Q	PQL
D6	J1V008	9/2/14	14300	X	2190	20200	BX	2190
D7	J1V009	9/2/14	19300	X	2190	8390	BX	2190
D8	J1V010	9/2/14	2180	UX	2180	5070	BJX	2180
D9	J1V011	9/2/14	20200	X	2180	3710	BJX	2180
D10	J1V012	9/2/14	24300	X	2190	8640	BX	2190
D11	J1V017	9/4/14	2180	U	2180	5710	J	2180
D12	J1V018	9/4/14	2280	J	2200	6870	B	2200
D13	J1V019	9/4/14	2210	U	2210	5550	BJ	2210
D14	J1V020	9/4/14	2220	U	2220	7550	B	2220
D15	J1V021	9/4/14	2180	U	2180	6320	BJ	2180
D16	J1V026	9/4/14	398000	D	21600	142000	BD	21600
D17	J1V027	9/4/14	2170	U	2170	6450	BJ	2170
D18	J1V028	9/4/14	2190	U	2190	3970	BJ	2190
D19	J1V029	9/4/14	2270	U	2270	4770	BJ	2270
D20	J1V086	9/9/14	6100	J	2220	16700		2220
D21	J1V087	9/9/14	3110	J	2220	7620		2220
D22	J1V088	9/9/14	3110	J	2200	8130		2200
D23	J1V089	9/9/14	44100		2190	33600		2190
D24	J1V090	9/9/14	2230	U	2230	29300		2230
D25	J1V091	9/17/14	2390	J	2240	6380	J	2240
D26	J1V092	9/17/14	2270	U	2270	4580	J	2270
D27	J1V093	9/17/14	2180	U	2180	5750	J	2180
D28	J1V094	9/17/14	3650	J	2190	9600		2190
D29	J1V095	9/17/14	29800		2180	32700		2180
D30	J1V096	9/17/14	3550	J	2180	8510		2180
D31	J1V097	9/17/14	2840	J	2180	8800		2180
D32	J1V098	9/17/14	2200	U	2200	4430	J	2200
D33	J1V099	9/17/14	2190	U	2190	4870	J	2190
D34	J1V0C0	9/17/14	2180	U	2180	5190	J	2180
D35	J1V0F5	9/24/14	2290	U	2290	2360	J	2290
D36	J1V0F6	9/24/14	109000		2340	73100		2340
D37	J1V0F7	9/24/14	67700		2360	42800		2360
D38	J1V0F8	9/24/14	2210	U	2210	3540	J	2210
D39	J1V0F9	9/24/14	2380	U	2380	2530	J	2380
D40	J1V0H0	9/24/14	5550000	D	442000	2060000	D	442000
D41	J1V0H1	9/24/14	2290	U	2290	3030	J	2290
D42	J1V0H2	9/24/14	2410	U	2410	3780	J	2410
D43	J1V0H3	9/24/14	2480	U	2480	2880	J	2480
D44	J1V0H4	9/24/14	2300	U	2300	6220	J	2300
D45	J1V0M3	10/7/14	15100		2190	14400		2190
D46	J1V0M4	10/7/14	7430		2200	12000		2200
D47	J1V0M5	10/7/14	293000	D	22300	175000	D	22300
D48	J1V0M6	10/7/14	2240	U	2240	2530	J	2240
D49	J1V0M7	10/7/14	2190	U	2190	7650		2190
D50	J1V0M8	10/7/14	3680	J	2220	11100		2220
D51	J1V0M9	10/7/14	2200	U	2200	5150	J	2200
D52	J1V0N0	10/7/14	2200	U	2200	3070	J	2200
D53	J1V0N1	10/7/14	2260	U	2260	3450	J	2260
D54	J1V0N2	10/7/14	2320	U	2320	2320	U	2320

Table C-1. 100-D-75:1 In-process Sampling Results - Total Petroleum Hydrocarbons (Page 2 of 8).

Sanple Location	HEIS Number	Date	TPH - diesel range			TPH - motor oil (high boiling)		
			TPH			TPH		
			ug/kg	Q	PQL	ug/kg	Q	PQL
D55	J1V0X2	10/7/14	2240	U	2240	2990	J	2240
D56	J1V0X3	10/7/14	3030	J	2230	6370	J	2230
D57	J1V0X4	10/7/14	2200	U	2200	5070	J	2200
D58	J1V0X5	10/7/14	2210	U	2210	10000		2210
D59	J1V0X6	10/7/14	2200	U	2200	9640		2200
D60	J1V0X7	10/7/14	2230	U	2230	6640	J	2230
D61	J1V0X8	10/7/14	2200	U	2200	3310	J	2200
D62	J1V0X9	10/7/14	2190	U	2190	3720	J	2190
FS	J1V100	10/7/14	4160000	D	112000	1410000	D	112000
D16	J1V101	10/7/14	5920	J	2190	4210	J	2190
D-16 resample	J1V165	10/16/14	7180		2260	6960		2260
D-40 resample	J1V166	10/16/14	19800000	D	677000	7530000	D	677000
D-36 resample	J1V167	10/16/14	10900		2290	11700		2290
D-47 resample	J1V168	10/16/14	4160	J	2300	6880	J	2300
FS-Resample	J1V199	10/28/14	3540	J	2310	5240	J	2310
D40 resample	J1V1C6	10/28/14	2250	U	2250	2260	J	2250

Table C-1. 100-D-75:1 In-process Sampling Results - Metals (Page 3 of 8).

Sampling Location	HEIS Number	Date	Aluminum			Antimony			Arsenic			Barium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	7090	X	1.4	0.36	U	0.36	2.4		0.62	72.6	X	0.071

Sampling Location	HEIS Number	Date	Beryllium			Boron			Cadmium			Calcium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	0.46		0.031	2.8		0.92	0.84		0.038	6610	X	13.2

Sampling Location	HEIS Number	Date	Chromium			Cobalt			Copper			Iron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	9.5	X	0.054	7.5	X	0.093	16.4	X	0.20	18800	X	3.6

Sampling Location	HEIS Number	Date	Lead			Magnesium			Manganese			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	8.2		0.25	4450	X	3.5	290	X	0.093	0.27	B	0.24

Sampling Location	HEIS Number	Date	Nickel			Potassium			Selenium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	10.0	X	0.12	1000		38.3	1.1		0.80	212		5.3

Sampling Location	HEIS Number	Date	Silver			Sodium			Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Stained Soil	J1TL52	4/24/14	0.15	U	0.15	413		55.2	42.8	X	0.088	63.9	XN	0.37

Sampling Location	HEIS Number	Date	Mercury			% moisture (wet sample)		
			mg/kg	Q	PQL	%	Q	PQL
Stained Soil	J1TL52	4/24/14	0.058	M	0.0063	5.4		0.1

Table C-1. 100-D-75:1 In-process Sampling Results - Polychlorinated Biphenyls (Page 4 of 8).

CONSTITUENT	CLASS	J1TL52			J1V003			J1V004			J1V005		
		04/24/14			09/02/14			09/02/14			09/02/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.9	U	2.9	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1221	PCB	8.4	U	8.4	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1232	PCB	2.1	U	2.1	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1242	PCB	4.9	U	4.9	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1248	PCB	4.9	U	4.9	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1254	PCB	2.7	U	2.7	1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1260	PCB	2.7	U	2.7	1.12	U	1.12	1.12	U	1.12	141	D	5.61
Aroclor-1262	PCB				1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61
Aroclor-1268	PCB				1.12	U	1.12	1.12	U	1.12	5.61	DU	5.61

CONSTITUENT	CLASS	J1V006			J1V007			J1V008			J1V009		
		09/02/14			09/02/14			09/02/14			09/02/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1221	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1232	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1242	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1248	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1254	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1260	PCB	29.1		1.12	34.3		1.12	148	D	5.6	15.4		1.12
Aroclor-1262	PCB	1.12	U	1.12	1.12	U	1.12	5.6	DU	5.6	1.12	U	1.12
Aroclor-1268	PCB	1.12	U	1.12	14.2		1.12	5.6	DU	5.6	1.12	U	1.12

CONSTITUENT	CLASS	J1V010			J1V011			J1V012			J1V017		
		09/02/14			09/02/14			09/02/14			09/04/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1221	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1232	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1242	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1248	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1254	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1260	PCB	9.33		1.12	1.12	U	1.12	2.97	J	1.12	5.84		1.11
Aroclor-1262	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11
Aroclor-1268	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11

CONSTITUENT	CLASS	J1V018			J1V019			J1V020			J1V021		
		09/04/14			09/04/14			09/04/14			09/04/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1221	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1232	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1242	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1248	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1254	PCB	1.13	U	1.13	5.91		1.14	10.8		1.14	1.51	J	1.13
Aroclor-1260	PCB	1.54	J	1.13	1.14	U	1.14	11		1.14	1.65	J	1.13
Aroclor-1262	PCB	1.13	U	1.13	4.98		1.14	1.14	U	1.14	1.13	U	1.13
Aroclor-1268	PCB	1.13	U	1.13	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13

Table C-1. 100-D-75:1 In-process Sampling Results - Polychlorinated Biphenyls (Page 5 of 8).

CONSTITUENT	CLASS	J1V026			J1V027			J1V028			J1V029		
		09/04/14			09/04/14			09/04/14			09/04/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1221	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1232	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1242	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1248	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1254	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.65	J	1.16
Aroclor-1260	PCB	2.38	J	1.12	1.12	U	1.12	1.89	J	1.14	1.68	J	1.16
Aroclor-1262	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16
Aroclor-1268	PCB	1.12	U	1.12	1.12	U	1.12	1.14	U	1.14	1.16	U	1.16

CONSTITUENT	CLASS	J1V086			J1V087			J1V088			J1V089		
		09/09/14			09/09/14			09/09/14			09/09/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1221	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1232	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1242	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1248	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1254	PCB	17.4		1.14	1.14	U	1.14	1.13	U	1.13	5.45		1.12
Aroclor-1260	PCB	60.6		1.14	1.65	J	1.14	1.33	J	1.13	10.2		1.12
Aroclor-1262	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12
Aroclor-1268	PCB	1.14	U	1.14	1.14	U	1.14	1.13	U	1.13	1.12	U	1.12

CONSTITUENT	CLASS	J1V090			J1V091			J1V092			J1V093		
		09/09/14			09/17/14			09/17/14			09/17/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1221	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1232	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1242	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1248	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1254	PCB	1.14	U	1.14	39.2		1.15	9.94	P	1.16	1.12	U	1.12
Aroclor-1260	PCB	1.14	U	1.14	16.3		1.15	16.1		1.16	1.12	U	1.12
Aroclor-1262	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12
Aroclor-1268	PCB	1.14	U	1.14	1.15	U	1.15	1.16	U	1.16	1.12	U	1.12

CONSTITUENT	CLASS	J1V094			J1V095			J1V096			J1V097		
		09/17/14			09/17/14			09/17/14			09/17/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1221	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1232	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1242	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1248	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1254	PCB	4.12		1.12	1.12	U	1.12	3.26	J	1.12	12.3		1.12
Aroclor-1260	PCB	12.4		1.12	33.4		1.12	7.36		1.12	21.7		1.12
Aroclor-1262	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12
Aroclor-1268	PCB	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12	1.12	U	1.12

Table C-1. 100-D-75:1 In-process Sampling Results - Polychlorinated Biphenyls (Page 6 of 8).

CONSTITUENT	CLASS	J1V098			J1V099			J1V0C0			J1V0F5		
		09/17/14			09/17/14			09/17/14			09/24/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1221	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1232	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1242	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1248	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1254	PCB	1.12	U	1.12	1.12	U	1.12	1.81	J	1.11	1.17	U	1.17
Aroclor-1260	PCB	1.12	U	1.12	1.8	J	1.12	2.43	J	1.11	22.3		1.17
Aroclor-1262	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17
Aroclor-1268	PCB	1.12	U	1.12	1.12	U	1.12	1.11	U	1.11	1.17	U	1.17

CONSTITUENT	CLASS	J1V0F6			J1V0F7			J1V0F8			J1V0F9		
		09/24/14			09/24/14			09/24/14			09/24/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1221	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1232	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1242	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1248	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1254	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1260	PCB	14.9		1.19	2.72	J	1.21	2.52	J	1.13	18.3		1.22
Aroclor-1262	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22
Aroclor-1268	PCB	1.19	U	1.19	1.21	U	1.21	1.13	U	1.13	1.22	U	1.22

CONSTITUENT	CLASS	J1V0H0			J1V0H1			J1V0H2			J1V0H3		
		09/24/14			09/24/14			09/24/14			09/24/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1221	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1232	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1242	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1248	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1254	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1260	PCB	5.63	DU	5.63	3.16	J	1.15	2.89	J	1.23	1.27	U	1.27
Aroclor-1262	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27
Aroclor-1268	PCB	5.63	DU	5.63	1.15	U	1.15	1.23	U	1.23	1.27	U	1.27

CONSTITUENT	CLASS	J1V0H4			J1V0M3			J1V0M4			J1V0M5		
		09/24/14			10/07/14			10/07/14			10/07/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1221	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1232	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1242	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1248	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1254	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1260	PCB	2.45	J	1.17	6.77		1.14	7.28		1.12	6.86		1.15
Aroclor-1262	PCB	1.17	U	1.17	1.14	U	1.14	1.12	U	1.12	1.15	U	1.15
Aroclor-1268	PCB	1.17	U	1.17	3.62		1.14	3.17	J	1.12	1.15	U	1.15

Table C-1. 100-D-75:1 In-process Sampling Results - Polychlorinated Biphenyls (Page 7 of 8).

CONSTITUENT	CLASS	J1V0M6			J1V0M7			J1V0M8			J1V0M9		
		10/07/14			10/07/14			10/07/14			10/07/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1221	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1232	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1242	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1248	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1254	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1260	PCB	1.15	U	1.15	4.41		1.13	17.1		1.14	4.5		1.13
Aroclor-1262	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	1.13	U	1.13
Aroclor-1268	PCB	1.15	U	1.15	1.13	U	1.13	14.7		1.14	1.13	U	1.13

CONSTITUENT	CLASS	J1V0N0			J1V0N1			J1V0N2			J1V0X2		
		10/07/14			10/07/14			10/07/14			10/07/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1221	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1232	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1242	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1248	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1254	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	2.47	JP	1.15
Aroclor-1260	PCB	1.59	J	1.13	1.16	U	1.16	1.19	U	1.19	2.81	J	1.15
Aroclor-1262	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15
Aroclor-1268	PCB	1.13	U	1.13	1.16	U	1.16	1.19	U	1.19	1.15	U	1.15

CONSTITUENT	CLASS	J1V0X3			J1V0X4			J1V0X5			J1V0X6		
		10/07/14			10/07/14			10/07/14			10/07/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1221	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1232	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1242	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1248	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1254	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1260	PCB	3.4	J	1.16	2.25	J	1.12	4.15		1.13	2.4	J	1.13
Aroclor-1262	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13
Aroclor-1268	PCB	1.16	U	1.16	1.12	U	1.12	1.13	U	1.13	1.13	U	1.13

CONSTITUENT	CLASS	J1V0X7			J1V0X8			J1V0X9			J1V100		
		10/07/14			10/07/14			10/07/14			10/07/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1221	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1232	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1242	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1248	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1254	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1260	PCB	15.2		1.15	34.1		1.13	28.2		1.14	11.5	DU	11.5
Aroclor-1262	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5
Aroclor-1268	PCB	1.15	U	1.15	1.13	U	1.13	1.14	U	1.14	11.5	DU	11.5

Table C-1. 100-D-75:1 In-process Sampling Results - Polychlorinated Biphenyls (Page 8 of 8).

CONSTITUENT	CLASS	J1V101			J1V165			J1V166			J1V167		
		10/07/14			10/16/14			10/16/14			10/16/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1221	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1232	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1242	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1248	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1254	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	4.69		1.18
Aroclor-1260	PCB	1.12	U	1.12	1.26	J	1.16	116	DU	116	3.47	J	1.18
Aroclor-1262	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18
Aroclor-1268	PCB	1.12	U	1.12	1.16	U	1.16	116	DU	116	1.18	U	1.18

CONSTITUENT	CLASS	J1V168			J1V199			J1V1C6		
		10/16/14			10/28/14			10/28/14		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1221	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1232	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1242	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1248	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1254	PCB	1.18	U	1.18	3.82		1.18	1.15	U	1.15
Aroclor-1260	PCB	1.18	U	1.18	2.27	J	1.18	1.15	U	1.15
Aroclor-1262	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15
Aroclor-1268	PCB	1.18	U	1.18	1.18	U	1.18	1.15	U	1.15

APPENDIX D

DATA QUALITY ASSESSMENT

APPENDIX D

DATA QUALITY ASSESSMENT

VERIFICATION SAMPLING

A data quality assessment (DQA) was performed to compare the verification sampling approach and resulting analytical data with the sampling and data requirements specified in the site-specific sample design (WCH 2015b). This DQA was performed in accordance with site-specific data quality objectives found in the *100 Area Remedial Action Sampling and Analysis Plan* (100 Area SAP) (DOE-RL 2009).

A review of the sample design (WCH 2015b), the field logbook (WCH 2015a), and applicable analytical data packages has been performed as part of this DQA. All samples were collected and analyzed per the sample design, with minimal alterations, as warranted by field conditions.

To ensure quality data, the 100 Area SAP (DOE-RL 2009) data assurance requirements and the data validation procedures for chemical analysis (BHI 2000) is used as appropriate. This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use (i.e., closeout decisions). The DQA completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process (EPA 2006).

Verification data from samples collected at the 100-D-75:1 subsite were provided by the laboratories in two sample delivery groups (SDGs): SDG JP0899 and SDG JP0900. SDG JP0899 was submitted for third-party validation. No major deficiencies were identified in the 100-D-75:1 data set. Minor deficiencies are discussed for the data set, as follows below. If no comments are made about a specific analysis, it should be assumed that no deficiencies affecting the quality of the data were found.

MINOR DEFICIENCIES

SDG JP0899

This SDG comprises 13 total samples (J1V3P2 through J1V3P9 and J1V3R0 through J1V3R4) collected from the 100-D-75:1 subsite excavation. This SDG includes one field duplicate pair (J1V3P5/J1V3R4). These field samples were analyzed for inductively coupled plasma (ICP) metals, mercury, total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), and semivolatile organic compounds (SVOCs). The field equipment blank sample (J1V3W1) was collected and analyzed for ICP metals and mercury. SDG JP0899 was submitted for third-party validation. Minor deficiencies are as follows.

In the ICP metals analysis, the matrix spike (MS) recoveries for antimony (55%) and silicon (12%) are outside the quality control (QC) limits. Third-party validation qualified all antimony

and silicon results in SDG JP0899 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the laboratory control sample (LCS) recovery for silicon (9%) is outside the laboratory QC limits. The laboratory has qualified associated silicon results with "J" flags. Silicon has a history of poor analytical performance. These data may be considered estimated. Estimated data are usable for decision-making purposes.

SDG JP0900

This SDG comprises 14 samples (J1V3T8 through J1V3T9, J1V3V0 through J1V3V9, J1V3W0 through J1V3W1) collected from the 100-D-75:1 subsite staging pile area (SPA). This SDG includes one field duplicate pair (J1V3T8/J1V3W0). These field samples were analyzed for ICP metals, mercury, TPH, SVOCs, and PCBs. Minor deficiencies are as follows.

In the ICP metals analysis, serial dilution of a digestate indicates physical and chemical interferences are present for chromium and vanadium. The laboratory has qualified results in samples J1V3T8 through J1V3T9, J1V3V0 through J1V3V9, and J1V3W0 through J1V3W1 for chromium and vanadium with "X" flags. These data may be considered estimated. Estimated data are usable for decision-making purposes.

SDG MA10683

This SDG comprises 13 verification soil samples (J1V3W2 through J1V3W9 and J1V3X0 through J1V3X4) from the 100-D-75:1 staging pile area. The samples were analyzed for bulk asbestos. No major or minor deficiencies were found in SDG MA10683. The data are usable for decision-making purposes.

SDG MA10686

This SDG comprises 13 verification soil samples (J1V3R5 through J1V3R9 and J1V3T0 through J1V3T7) from the 100-D-75:1 excavation area. The samples were analyzed for bulk asbestos. No major or minor deficiencies were found in SDG MA10686. The data are usable for decision-making purposes.

FIELD QUALITY ASSURANCE/QUALITY CONTROL

Relative percent difference (RPD) evaluations of main sample(s) versus the laboratory duplicate(s) are routinely performed and reported by the laboratory. Any deficiencies in those calculations are reported by SDG in the previous sections.

Field quality assurance (QA)/QC measures are used to assess potential sources of error and cross contamination of samples that could bias results. Field QA/QC samples listed in the field logbook (WCH 2015a) are shown in Table D-1. The main and QA/QC sample results are presented in Appendix B.

Table D-1. Field Quality Assurance/Quality Control Samples.

Sample Area	Main Sample	Duplicate Sample
Excavation area	J1V3P5/J1V3R8	J1V3R4/J1V3T7
Staging pile area	J1V3T8/J1V3W2	J1V3W0/J1V3X4

Field duplicate samples are collected to provide a relative measure of the degree of local heterogeneity in the sampling medium, unlike laboratory duplicates that are used to evaluate precision in the analytical process. The field duplicates are evaluated by computing the RPD of the sample/duplicate pair(s) for each contaminant of potential concern. Relative percent differences are not calculated for analytes that are not detected in both the main and duplicate sample at more than five times the target detection limit (TDL). Relative percent differences of analytes detected at low concentrations (less than five times the detection limit) are not considered to be indicative of the analytical system performance. The calculation brief in Appendix B provides details on duplicate pair evaluation and RPD calculation.

In the excavation area duplicate evaluation, the RPDs calculated for magnesium (30.5%) and vanadium (33.5%) are above the acceptance criteria of 30%. No additional deficiencies were noted.

Elevated RPDs in environmental samples are generally attributed to natural heterogeneities in the sample matrix. There is no indication that the analytical system was operating out of control. The data are usable for decision-making purposes.

A secondary check of the data variability is used when one or both of the samples being evaluated (main and duplicate) is less than five times the TDL, including undetected analytes (Appendix B). In these cases, a control limit of ±2 times the TDL is used to indicate that a visual check of the data is required by the reviewer. The secondary check flagged the sodium data from the excavation for a visual review. No additional deficiencies were noted. The data are usable for decision-making purposes.

A visual inspection of all of the data is also performed. No additional major or minor deficiencies are noted. The data are usable for decision-making purposes.

SUMMARY

Limited, random, or sample matrix-specific influenced batch QC issues such as those discussed above are a potential for any analysis. The number and types seen in these data sets are within expectations for the matrix types and analyses performed. The DQA review of the 100-D-75:1 subsite verification sampling data found that the analytical results are accurate within the standard errors associated with the analytical methods, sampling, and sample handling. The DQA review for 100-D-75:1 subsite concludes that the reviewed data are of the right type, quality, and quantity to support the intended use. The analytical data were found acceptable for decision-making purposes.

The verification sample analytical data are stored in the Washington Closure Hanford project-specific database prior to being submitted for inclusion in the Hanford Environmental Information System database. The verification sample analytical data are also summarized in Appendix B.

REFERENCES

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