Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

13-AMRP-0107

FEB 08 2013

Ms. J. A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Dear Ms. Hedges:

TRANSMITTAL OF APPROVED WASTE SITE RECLASSIFICATION FORM NO. 2012-087 AND SUPPORTING DOCUMENTATION FOR THE 100-D-66, 116-DR-5 OUTFALL SPILLWAY WASTE SITE, REVISION 0

Attached for your use is the approved Waste Site Reclassification Form No. 2012-087 and supporting "Remaining Sites Verification Package for the 100-D-66, 116-DR-5 Outfall Spillway Waste Site," Rev.0. If you have questions, please contact me or your staff may contact Tom Post, of my staff, at (509) 376-3232.

Sincerely,

Mark S. French, Federal Project Director
for the River Corridor Closure Project

AMRP:TCP

Attachment

cc w/attach:
N. M. Menard, Ecology
Administrative Record, H6-08

cc w/o attach:
R. D. Cantwell, WCH
S. L. Feaster, WCH
T. Q. Howell, WCH
D. L. Plung, WCH
J. P. Shearer, CHPRC

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-DR-1 **Control No.:** 2012-087

Waste Site Code(s)/Subsite Code(s): 100-D-66, 116-DR-5 Outfall Spillway Waste Site

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-66, 116-DR-5 Outfall Spillway waste site is located within the 100-DR-1 Operable Unit, on the shore of the Columbia River, approximately 80 m (262 ft) north of the former location of the 116-D-7 (107-D) Retention Basin. The spillway received overflow from the former 1904-DR outfall (116-DR-5 waste site) in the event that effluent could not be completely discharged via the outfall pipelines (100-D-60 waste site). The 1904-DR outfall was used to discharge radioactive cooling water effluent from the 107-DR Retention Basin (116-DR-9 waste site). The majority of the spillway was covered with fill material at the time of the demolition of the outfall in 1978.

Because the 100-D-66 spillway extended into the Columbia River, the ordinary high water mark (OHWM) was used to partition the remediation of the waste site into an upland segment, located above the OHWM, and a shoreline segment, located below the OHWM. Remediation of the upland portion of the spillway was initiated on June 15, 2011 and was completed on May 1, 2012. Remediation of the portion of the 100-D-66 spillway located below the OHWM was performed November 18, 2011 through November 20, 2011, with excavation and backfill being done in a manner to preclude fish stranding due to fluctuating Columbia River flow rates. Approximately 3,400 bulk cubic meters of material was removed for disposal at the Environmental Restoration Disposal Facility (ERDF).

Verification sampling of the upland segment was performed on August 15 and 16, 2012, to determine if the waste site meets the 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*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington (Remaining Sites ROD) (EPA 1999). The selected remedy involved (1) excavating the site to the extent required to meet specified soil cleanup levels, (2) disposing of contaminated excavation materials at ERDF at the 200 Area of the Hanford Site, (3) demonstrating through verification sampling that cleanup goals have been achieved, and (4) proposing the site for reclassification as Interim Closed Out.

The results of the sampling of the shoreline segment is included in the *Remaining Sites Verification Package for the 100-D-66, 116-DR-5 Spillway Waste Site* (attached) and will be provided for consideration as part of the final record of decision for the 100-D Area.

Basis for reclassification:

The verification sample results for the upland segment of the 100-D-66 waste site were evaluated in comparison to the RAGs. In accordance with this evaluation, the sampling results for the 100-D-66 waste site support a reclassification of the waste site to Interim Closed Out. The current site conditions achieve the RAOs and RAGs established by 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 analytical results and rationale presented in the attached remaining sites verification package also demonstrate that residual contaminant concentrations meet direct exposure cleanup criteria and are protective of groundwater and the Columbia River. Therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

The sediment sample results collected within the remediated shoreline of the 100-D-66 waste site exceed soil RAGs for upland areas. However, it is not appropriate to apply interim action soil RAGs to sediments collected below the OWHM, and the Remaining Sites ROD does not provide in-water cleanup levels for sediment. Negotiations during the Project Manager's dispute initiated February 10, 2012, addressed rewetted zones and river sediment waste sites. During these negotiations, the U.S. Department of Energy agreed to specifically evaluate the 116-H-5 outfall and related shoreline sites in the upcoming 100-D/100-H Remedial Investigation/Feasibility Study. This evaluation should include at a minimum discussions of river sediment backgrounds and specific applicability of modeling methods to soils in the periodically rewetted zone along the shoreline.

The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-D-66,116-DR-5 Spillway Waste Site* (attached).

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-DR-1 **Control No.:** 2012-087

Waste Site Code(s)/Subsite Code(s): 100-D-66, 116-DR-5 Outfall Spillway Waste Site

Regulator comments:

Approval of this WSRF documents regulator agreement that the 100-D-66 waste site qualifies for "Interim Closed Out" under this Interim Action ROD. In addition, Ecology has evaluated the data for this site against WAC 173-340 (2007) clean-up levels for direct contact, groundwater protection, and river protection. This evaluation is documented in the letter transmitting Ecology's approval of the site's interim reclassification to "Interim Closed Out."

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	[signature]	1/10/13
DOE Federal Project Director (printed)	Signature	Date
N. Menard	Nina M. Menard	1/17/13
Ecology Project Manager (printed)	Signature	Date
N/A		
EPA Project Manager (printed)	Signature	Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-66, 116-DR-5 OUTFALL SPILLWAY WASTE SITE

Attachment to Waste Site Reclassification Form 2012-087

February 2013

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-66, 116-DR-5 OUTFALL SPILLWAY WASTE SITE

EXECUTIVE SUMMARY

The 100-D-66, 116-DR-5 Outfall Spillway waste site, located in the 100-DR-1 Operable Unit, was a buried emergency overflow spillway located east and north of the former 116-DR-5 outfall and north of the former 116-D-7 Retention Basin. The spillway was designed to receive overflow from the 116-DR-5 outfall in the event that effluent could not be completely discharged via the outfall pipeline. The 116-DR-5 outfall was used to discharge radioactive cooling water effluent from the 116-DR-9 Retention Basin to the Columbia River. The 116-DR-5 outfall was demolished in 1978, and the majority of the 100-D-66 spillway was covered with fill material at that time.

The 100-D-66, 116-DR-5 Outfall Spillway waste site was identified for remove-treat-dispose (RTD) in the *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision* (Remaining Sites ESD) (EPA 2009) based on confirmatory sampling performed on January 5 through January 9, 2006, as specified in the confirmatory sampling work instruction (WCH 2005). A test pit was excavated to expose the surface of the concrete spillway. Elevated radiological activity measuring up to 14,000 disintegrations per minute was detected on the concrete surface. A sample and duplicate sample of the concrete was collected for laboratory analysis. Cesium-137, cobalt-60, europium-152, europium-154, and total beta radiostrontium were detected at the 100-D-66 waste site at activity levels exceeding the cumulative direct exposure remedial action goal (RAG) for beta and gamma emitters (15 mrem/yr above background), based on RESidual RADioactivity modeling (DOE-RL 2009b). Multiple nonradioactive metals were also detected at concentrations exceeding direct exposure RAGs and/or soil RAGs for the protection of groundwater and/or the Columbia River. Because the direct exposure RAGs were exceeded as indicated by the confirmatory sample results, the 100-D-66 waste site was recommended for remedial action.

The 100-D-66 spillway waste site consists of two components: an upland segment located above the Columbia River ordinary high water mark (OHWM) and a shoreline segment located below the OHWM and above the ordinary low water mark. Remediation of the upland segment of the spillway was initiated on June 15, 2011 and completed on May 1, 2012, consistent with existing protocols specified in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (100 Area RDR/RAWP) (DOE-RL 2009b). Remediation of the portion of the 100-D-66 waste site located below the OHWM was performed November 18 through November 20, 2011, during low Columbia River flows, as agreed to with the Washington State Department of Ecology to preclude fish stranding due to fluctuating Columbia River flow rates (WCH 2011b). Approximately 3,400 bulk cubic meters of material was excavated, stockpiled, and later disposed at the Environmental Restoration Disposal Facility (ERDF).

Verification sampling of the upland segment of the soil within the excavation was conducted on August 15, 2012. The results indicated that the waste removal action achieved compliance with the remedial action objectives (RAOs) for the 100-D-66 waste site. A summary of the cleanup evaluation for the soil results against the applicable criteria is presented in Table ES-1.

Table ES-1. Summary of Remedial Action Goals for the Upland Segment of the 100-D-66 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain 15 mrem/yr dose rate above background over 1,000 years.	Dose rate from sum-of-fractions evaluation for the excavation using dose-equivalent lookup values is less than 15 mrem/yr. The maximum cumulative dose rate for the waste site is 8.68 mrem/yr.	Yes
Direct Exposure – Nonradionuclides	Attain individual COC/COPC RAGs.	All detected COCs/COPCs were quantified below the direct exposure RAGs.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of less than 1 for all individual noncarcinogens.	All individual hazard quotients are less than 1.	Yes
	Attain a cumulative hazard quotient of less than 1 for noncarcinogens.	The cumulative hazard quotient (3.7×10^{-3}) is less than 1.	
	Attain an excess cancer risk of less than 1×10^{-6} for individual carcinogens.	All individual carcinogens are less than 1×10^{-6} cancer risk.	
	Attain a cumulative excess cancer risk of less than 1×10^{-5} for carcinogens.	The excess cancer risk (4.0×10^{-7}) is less than 1×10^{-5}.	
Groundwater/River Protection – Radionuclides	Attain single COC/COPC groundwater and river protection RAGs.	Radionuclide COPCs were not quantified at activities above groundwater/river protection lookup values.	Yes
	Attain national primary drinking water standards [a]: 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.	Radionuclide COPCs were not quantified at activities above groundwater/river protection lookup values.	
	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].	No alpha-emitting radionuclide COPCs were quantified above groundwater/river protection lookup values.	
	Meet total uranium standard of 30 µg/L (21.2 pCi/L) [c].	Uranium was not quantified above background levels for the upland portion of this site.	

Table ES-1. Summary of Remedial Action Goals for the Upland Segment of the 100-D-66 Waste Site. (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 several polycyclic aromatic hydrocarbons were detected in the excavation at concentrations exceeding the soil RAGs for protection of groundwater and/or the Columbia River. However, it is predicted that these constituents will not migrate to groundwater (and thus the Columbia River) at concentrations exceeding groundwater or river criteria within 1,000 years [d]. Therefore, residual concentrations achieve the RAOs for groundwater and river protection.	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 benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are not predicted to migrate because all of these contaminants have distribution coefficient (K_d) values greater than 80 mL/g. RESRAD modeling predicts that contaminants with K_d values greater than 80 mL/g will show no migration within the 100 Area vadose zone and no impact on groundwater or the Columbia River within 1,000 years. Therefore, residual concentrations of these constituents are predicted to be protective of groundwater and the Columbia River.

COC = contaminant of concern
COPC = contaminant of potential concern
MCL = maximum contaminant level
RAG = remedial action goal
RAO = remedial action objective
RDR/RAWP = *Remedial Design Report/Remedial Action Work Plan for the 100 Area*
RESRAD = RESidual RADioactivity

The results of the verification sampling are used to make reclassification decisions for the 100-D-66 waste site in accordance with the *Tri-Party Agreement Handbook Management Procedures,* TPA-MP-14 procedure (DOE-RL 2011).

Informational sampling of sediment samples collected within the remediated shoreline area was performed on November 18, 2011. Maximum contaminant concentrations for sediment within the remediated shoreline area exceed upland soil RAGs for chromium (total), lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Carbon-14 was detected in a single sample exceeding the direct exposure RAG. However, no further remediation of the shoreline area is recommended since interim action soil RAGs are not appropriately applied to sediments collected below the OHWM 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) does not provide in-water cleanup levels for sediment. Negotiations during the Project Manager's dispute initiated February 10, 2012, addressed rewetted zones and river sediment waste sites. During these negotiations, the U.S. Department of Energy (DOE) agreed to specifically evaluate the 116-H-5 outfall and related shoreline sites in the upcoming 100-D/100-H Remedial Investigation/Feasibility Study (WCH 2012b). This evaluation should include at a minimum discussions of river sediment backgrounds and specific applicability of modeling methods to soils in the periodically rewetted zone along the shoreline.

In accordance with this evaluation, the verification sampling results support a reclassification of this site to Interim Closed Out with the understanding that the DOE has agreed to evaluate shoreline sites and river sediments in the upcoming 100-D/100-H Feasibility Study (WCH 2012b). For the upland portion of the site, the current site conditions achieve the RAOs and the corresponding RAGs established in the 100 Area RDR/RAWP (DOE-RL 2009b) and the Remaining Sites ROD (EPA 1999). The results of verification sampling for the upland segment 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 for the upland segment also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. The upland segment of the site does not have residual contaminant concentrations that would require any institutional controls.

Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based on a limited ecological risk assessment. Although not required by the Remaining Sites ROD, a comparison against ecological risk screening levels has been made for the 100-D-66 waste site contaminants of concern, contaminants of potential concern, and other constituents and is presented in Appendix A. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for antimony, manganese, and vanadium. Ecological screening levels from *Washington Administrative Code* 173-340 were exceeded for boron, mercury, and vanadium. Because the concentrations of antimony, manganese, mercury, and vanadium are below the Hanford Site (DOE-RL 2001) background values, it is believed that the presence of these constituents does not pose risk to ecological receptors. Exceedance of screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-D-66, 116-DR-5 OUTFALL SPILLWAY WASTE SITE

STATEMENT OF PROTECTIVENESS

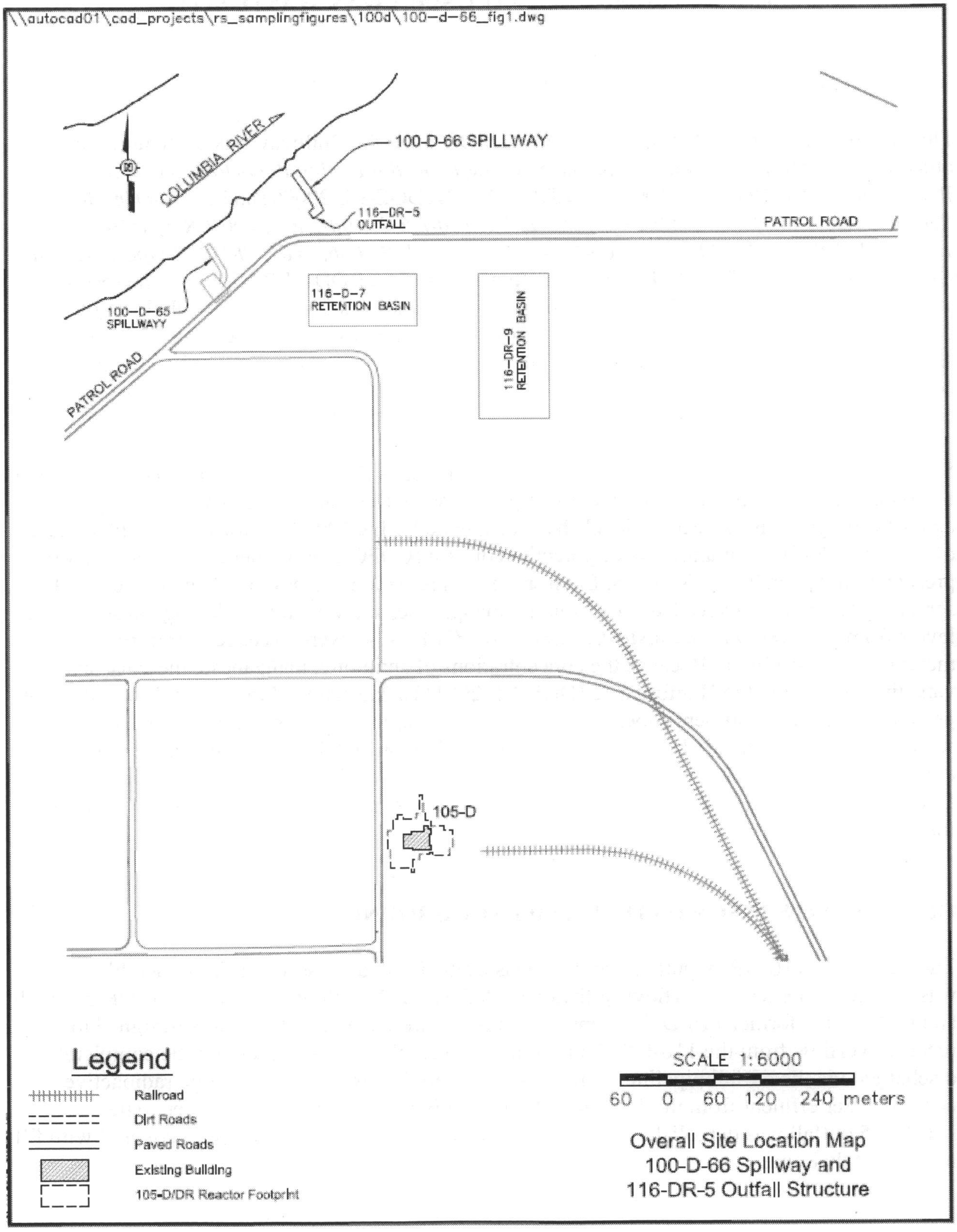
This report demonstrates that the 100-D-66, 116-DR-5 Outfall Spillway waste site meets the objectives for interim closure as established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (100 Area RDR/RAWP) (DOE-RL 2009b) and the *Interim Action Record of Decision for the 100-BC-1, 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). 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 sufficiently protective of groundwater and the Columbia River. 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 Remaining Sites ROD, a comparison against ecological risk screening levels has been made for the 100-D-66 waste site contaminants of concern (COCs), contaminants of potential concern (COPCs), and other constituents and is presented in Appendix A. The U.S. Environmental Protection Agency (EPA) ecological soil screening levels were exceeded for antimony, manganese, and vanadium. Ecological screening levels from *Washington Administrative Code* (WAC) 173-340 were exceeded for boron, mercury, and vanadium. Because the concentrations of antimony, manganese, mercury, and vanadium are below the Hanford Site (DOE-RL 2001) background values, it is believed that the presence of these constituents does not pose risk to ecological receptors. Exceedance of screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

GENERAL SITE INFORMATION AND BACKGROUND

The 100-D-66, 116-DR-5 Outfall Spillway waste site, located in the 100-DR-1 Operable Unit, was a buried emergency overflow spillway located east and north of the former 116-DR-5 outfall and north of the former 116-D-7 Retention Basin (Figure 1). The spillway was designed to receive overflow from the 116-DR-5 outfall in the event that effluent could not be completely discharged via the outfall pipeline. The 116-DR-5 outfall was used to discharge radioactive cooling water effluent from the 116-DR-9 Retention Basin to the Columbia River. The 116-DR-5 outfall was demolished in 1978, and the majority of the spillway was covered with fill material at that time.

Figure 1. 100-D-66 Waste Site Location Map.



Site Geophysical Survey Information

A geophysical survey was performed at the 100-D-66 waste site in May 2004 to locate and map any surface or subsurface features (Bergstrom and Mitchell 2004a, 2004b) (Figure 2). A large anomalous zone detected at the site is believed to be indicative of the buried spillway and remnants of the 1904-DR outfall structure. The magnetic anomaly observed in the southeastern portion of the survey area was reported to coincide with a visible manhole and might be indicative of the outfall pipeline or other buried features. Subsequent remediation of the spillway in the area of this anomaly did not identify any waste material or other feature.

REMEDIAL ACTION SUMMARY

Because the spillway extended into the Columbia River, the ordinary high water mark (OHWM) was used to partition the remediation of the waste site into an upland segment, located above the OHWM, and a shoreline segment, located below the OHWM. Remedial action of the upland portion of the 100-D-66 waste site was initiated on June 15, 2011, and was completed on May 1, 2012. The remedial design for the outfall structure was approved by the Washington State Department of Ecology. Remediation of the upland portion of the outfall above the ordinary OHWM was performed consistent with protocols as specified in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (100 Area RDR/RAWP) (DOE-RL 2009b). Remediation of the portion of the 100-D-66 waste site located below the OHWM was performed on November 18, 2011 through November 20, 2011. This below OHWM portion of the site was excavated and sampled separately. This excavation was performed in a manner to allow for backfill the same day as excavation to preclude fish stranding should river-level fluctuations cause potential flooding of the excavation. Approximately 3,400 bulk cubic meters of material was removed for disposal at the Environmental Restoration Disposal Facility (ERDF). Figure 3 provides a photograph of the 100-D-66 spillway waste site prior to remediation, and Figure 4 is a photograph of the site during remediation.

A post-excavation Global Positioning Environmental Radiological Surveyor (GPERS) survey of the excavation was conducted on May 2, 2012. The results of these surveys are provided in Appendix B and do not indicate the presence of radiological contamination.

After excavation of the upland portion of the 100-D-66 waste site, in-process soil samples were collected from within the base of the excavation on February 23, 2012, and used to evaluate the site to determine readiness for collection of verification soil samples. The results of this sampling are provided in Appendix C and indicated that additional soil removal was required. On April 30, 2012 through May 1, 2012, an additional 2 m (6.6 ft) of soil was removed from within the excavation and an additional round of in-process sampling was performed on May 3, 2012. The results of these samples indicated that adequate soil removal was performed and the site was ready for verification sample collection.

A post-excavation civil survey for the 100-D-66 waste site is provided in Figure 5. Figure 6 shows the location of the upland and shoreline portions of the remediated waste site.

Figure 2. Geophysical Survey Results and Confirmatory Sampling Location at the 100-D-66 Waste Site.

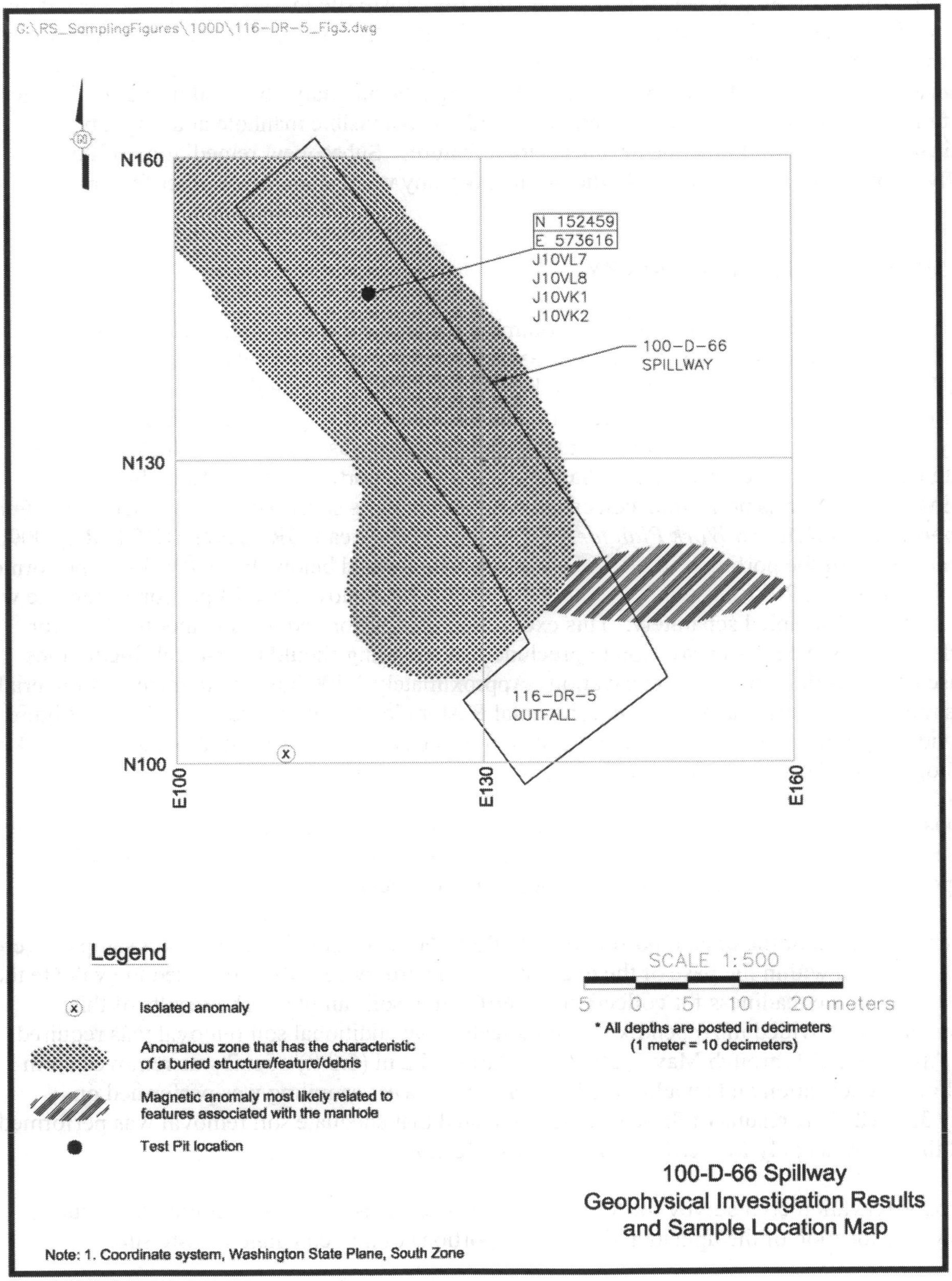


Figure 3. Photograph of the 100-D-66 Spillway Waste Site, Taken Prior to Remediation (November 2010).

Figure 4. Photograph of the 100-D-66 Spillway Waste Site, Taken During Remediation of the Shoreline Segment Located Above the OHWM (June 16, 2011).

Figure 5. Post-Excavation Civil Survey and Excavation Boundary for the Upland Portion of the 100-D-66 Waste Site.

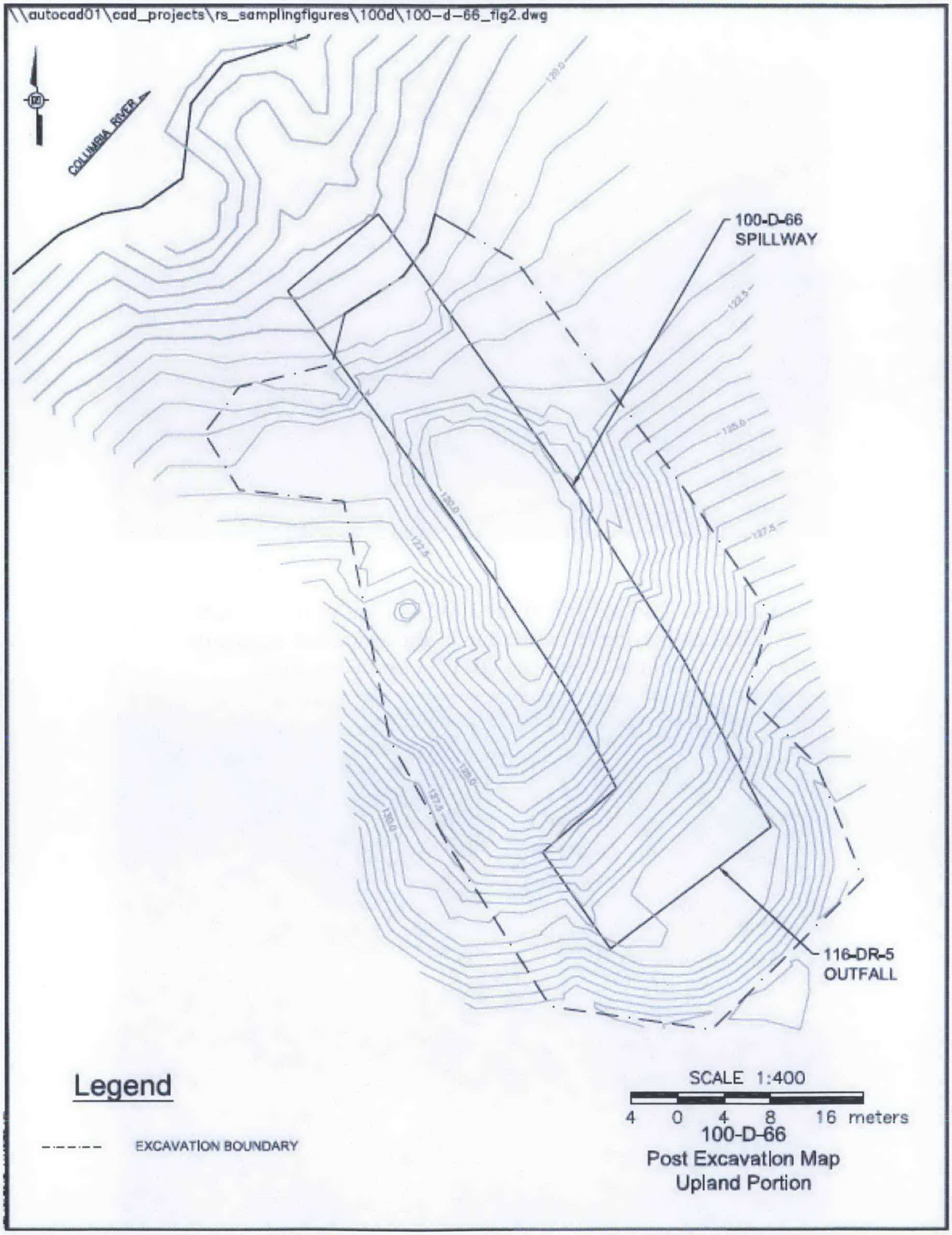
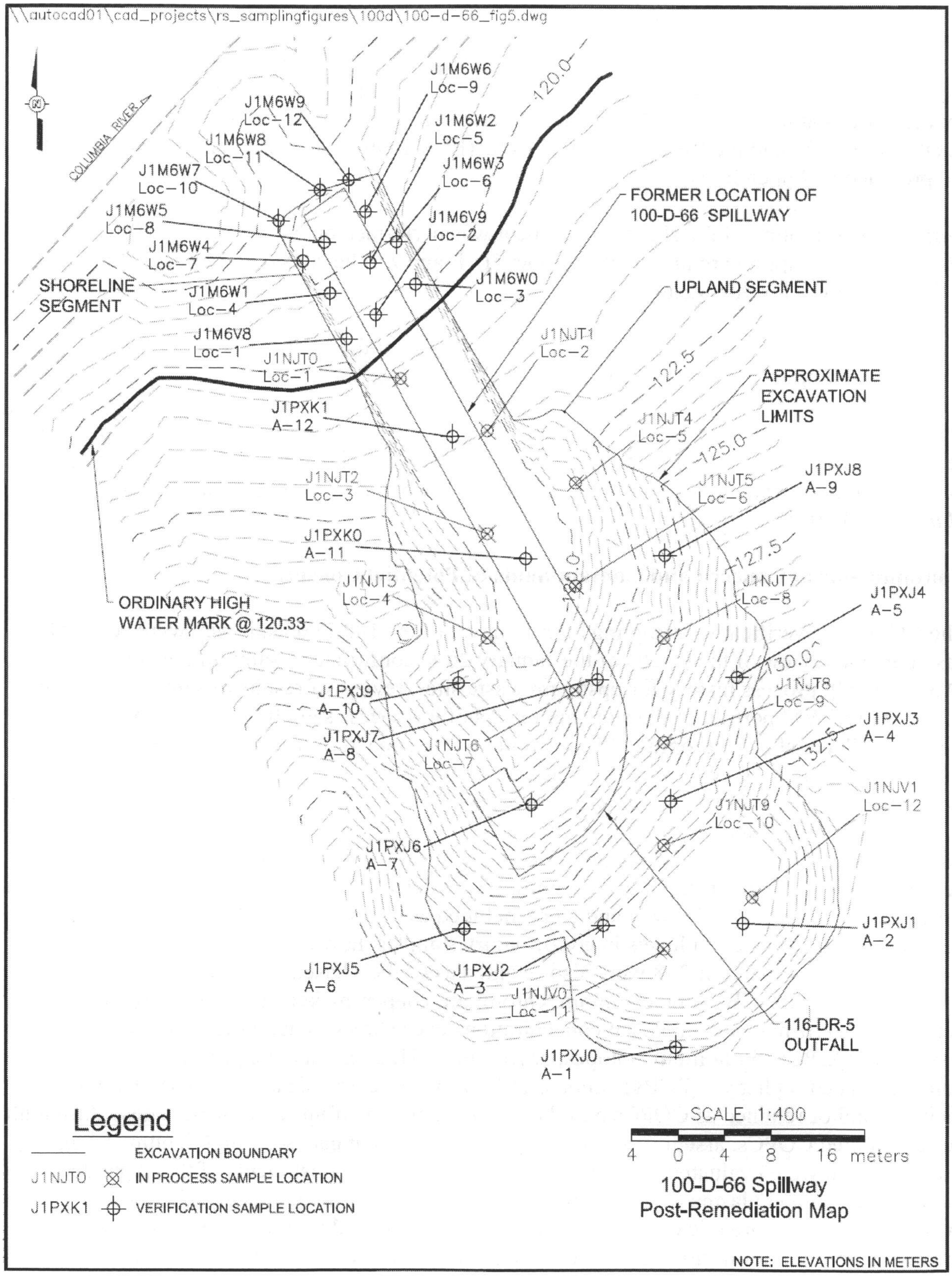


Figure 6. Post-Excavation Map for the 100-D-66 Spillway Waste Site.



VERIFICATION SAMPLING ACTIVITIES

Verification sampling of the upland segment of the 100-D-66 waste site excavation and waste staging area footprints was performed on August 15 and August 16, 2012, respectively. Verification sampling was performed to support a determination that residual contaminant concentrations at this site meet the cleanup criteria specified in the 100 Area RDR/RAWP (DOE-RL 2009b) and the Remaining Sites ROD (EPA 1999). The verification sample results are provided in Appendix D.

Verification sampling of the shoreline segment was performed on November 18, 2011. The results of this sampling are provided in Appendix E and will be considered as part of the final action evaluation for this waste site.

The following subsections provide additional discussion of the information used to develop the verification sampling design. A more detailed discussion of the verification sample design for the upland segment of the outfall can be found in the *Work Instruction for Verification Sampling of the Upland Portion of the 100-D-66, Spillway Waste Site* (WCH 2012c). Discussion of the verification sampling design for the shoreline segment is provided in the *Work Instruction for Verification Sampling of the 100-D-66 Spillway Waste Site Below the Ordinary High Water Mark* (WCH 2011b).

Contaminants of Concern and Contaminants of Potential Concern

The COPCs for verification sampling after removal of the 100-D-66 spillway were selected based upon a review of the results of the January 2006 confirmatory sampling event (Appendix C), process history for upstream waste sites, review of results of sampling for the below the OHWM portion of the site, and results of in-process sampling (Appendix C). Cesium-137, cobalt-60, europium-152, europium-154, and strontium-90 were detected in confirmatory sampling (WCH 2005) at concentrations that cumulatively exceeded direct exposure remedial action goals (RAGs) and were retained as COPCs. Carbon-14, nickel-63, and uranium-234 were detected in samples collected from below the ordinary high water mark (WCH 2011b) at an activity warranting retention as COPCs. Polycyclic aromatic hydrocarbons, pesticides, mercury, and hexavalent chromium were detected in in-process samples and samples collected from below the OHWM and were included as COPCs. Uranium isotopes were not detected above background levels in confirmatory samples; however, uranium-233/234, uranium-235, and uranium-238 were also retained as COPCs based on process history of upstream waste sites. Barium, cadmium, chromium, copper, nickel, silver, and zinc were detected in confirmatory samples at concentrations exceeding cleanup criteria and were therefore retained as COPCs. Plutonium isotopes, americium-241, antimony, copper, lead, polychlorinated biphenyls (PCBs), anions, and semivolatile organic analytes (SVOAs) were included and/or retained as COPCs based on process history of upstream waste sites. Although not considered COPCs, arsenic, beryllium, boron, cobalt, manganese, molybdenum, selenium, and vanadium were evaluated by performing analyses for the constituents of the expanded inductively coupled plasma (ICP) metals list. While not considered COPCs, the potential presence of volatile organic compounds (VOCs) was evaluated by field screening with an organic vapor monitor during confirmatory sampling activities and during remediation.

No VOCs were detected at the 100-D-66 waste site, and therefore no further laboratory analysis for VOCs was performed.

A summary of all the contaminants analyzed is provided in Table 1.

Table 1. 100-D-66 Laboratory Analytical Methods and Contaminants of Potential Concern.

Analytical Method	Contaminants of Potential Concern
ICP metals [a] – EPA Method 6010	Antimony, barium, cadmium, total chromium, copper, lead, nickel, silver, and zinc
Mercury – EPA Method 7471	Mercury
Hexavalent chromium – EPA Method 7196	Hexavalent chromium
IC anions – EPA Method 300.0	Inorganic anions
NO_2/NO_3 [b] – EPA Method 353	Nitrate/nitrite
PCB – EPA Method 8082	Polychlorinated biphenyls
PAH [c] – EPA Method 8310	Polycyclic aromatic hydrocarbons
Pesticides – EPA Method 8081	Pesticides
SVOA – EPA Method 8270	Semivolatile organic compounds
GEA – Gamma spectroscopy	Americium-241, cobalt-60, cesium-137, europium-152, europium-154, europium-155
Sr-90 – Liquid scintillation counting	Strontium-90
Ni-63 – Liquid scintillation counting	Nickel-63
C-14 – Liquid scintillation counting	Carbon-14
Isotopic plutonium	Plutonium-238, plutonium-239/240
Isotopic uranium	Uranium-233/234, uranium-235, uranium-238

[a] Analysis for the expanded list of ICP metals was performed to include arsenic, beryllium, boron, cobalt, manganese, molybdenum, selenium, and vanadium.
[b] To preclude holding time issues associated with EPA Method 300.0 for nitrites and nitrates, EPA Method 353 was performed.
[c] Because method 8310 is specifically meant to analyze for PAH, data from this method were used preferentially over method 8270 data for site evaluation of the PAH analytes.

EPA = U.S. Environmental Protection Agency
GEA = gamma energy analysis
IC = ion chromatography
ICP = inductively coupled plasma
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOA = semivolatile organic analysis

Verification Sample Design

Two separate sample designs were developed for the 100-D-66 waste site: one for the upland segment (WCH 2012c) and another for the shoreline segment (WCH 2011b). A statistical sampling design was used for each of these segments, with 12 soil samples collected from within each of the 2 excavation footprint areas. In addition, the upland segment sampling design included verification sampling of two waste staging area footprints. 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* (SAP) (DOE-RL 2009a). Additional information related to sampling can be found in the field sampling logbooks (WCH 2011a, 2012a).

The verification sample locations for the upland segment, including waste staging area footprints are shown in Figure 7, and the sample locations are listed in Table 2. Sediment sample locations for the shoreline segment are shown in Figure 8 and the sample locations are listed in Table 3 and Appendix E.

Verification Sampling Results

Verification samples were analyzed using EPA-approved analytical methods. The laboratory-reported verification data results for all constituents are stored in the Environmental Restoration (ENRE) project-specific database prior to archival in the Hanford Environmental Information System (HEIS) and are presented as Attachment 1 of the 95% upper confidence limit (UCL) calculation (Appendix D). The analytical results for the shoreline segment are provided in Appendix E.

The 95% UCLs on the true population means for residual concentrations of COCs and COPCs were calculated for the excavation and waste staging area footprints as specified by the 100 Area RDR/RAWP (DOE-RL 2009b), with calculations provided in Appendix D. When a nonradionuclide COC or COPC was detected in fewer than 50% of the verification samples collected for the area, the maximum detected value was used for comparison to RAGs. If no detections for a given COC/COPC were reported in the data set, then no statistical evaluation or calculations were performed for that COC/COPC.

Comparisons of the statistical and maximum results for the COPCs against the site RAGs for the excavation and the waste staging area footprints are summarized in Table 4 and Table 5, respectively. Contaminants that were not detected by laboratory analysis are excluded from these tables but are reported in Appendix D. Calculated cleanup levels are not presented in the Cleanup Levels and Risk Calculations database (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 COPCs and are not included in these tables. The laboratory-reported data results for all constituents are stored in the ENRE project-specific database prior to provision to HEIS and are presented as an attachment to the statistical calculations in Appendix D.

Figure 7. Location of Verification Samples for the Upland Segment of the 100-D-66 Spillway Waste Site.

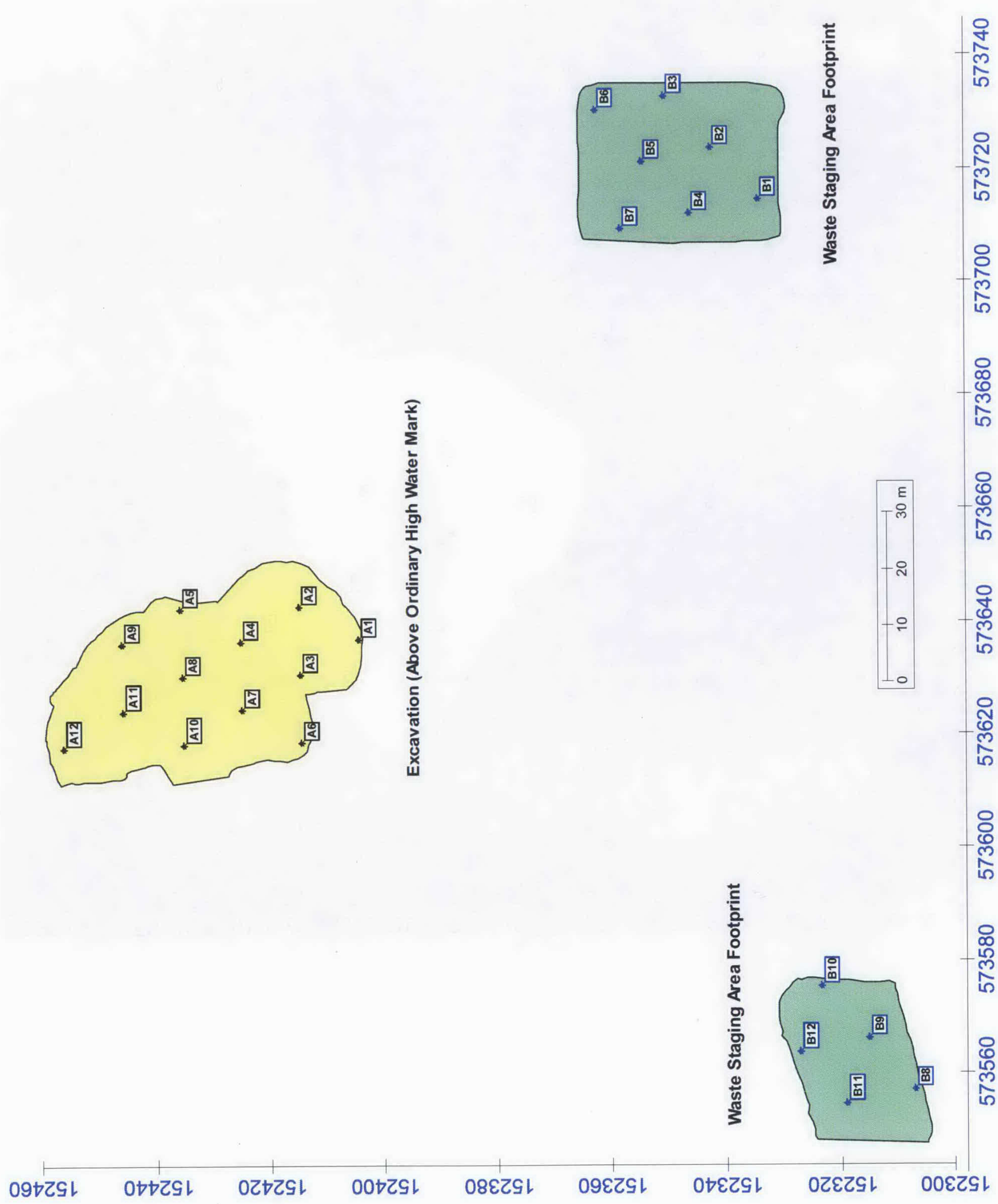


Figure 8. Location of Sediment Samples for Shoreline Segment of the 100-D-66 Waste Site – Below the Ordinary High Water Mark.

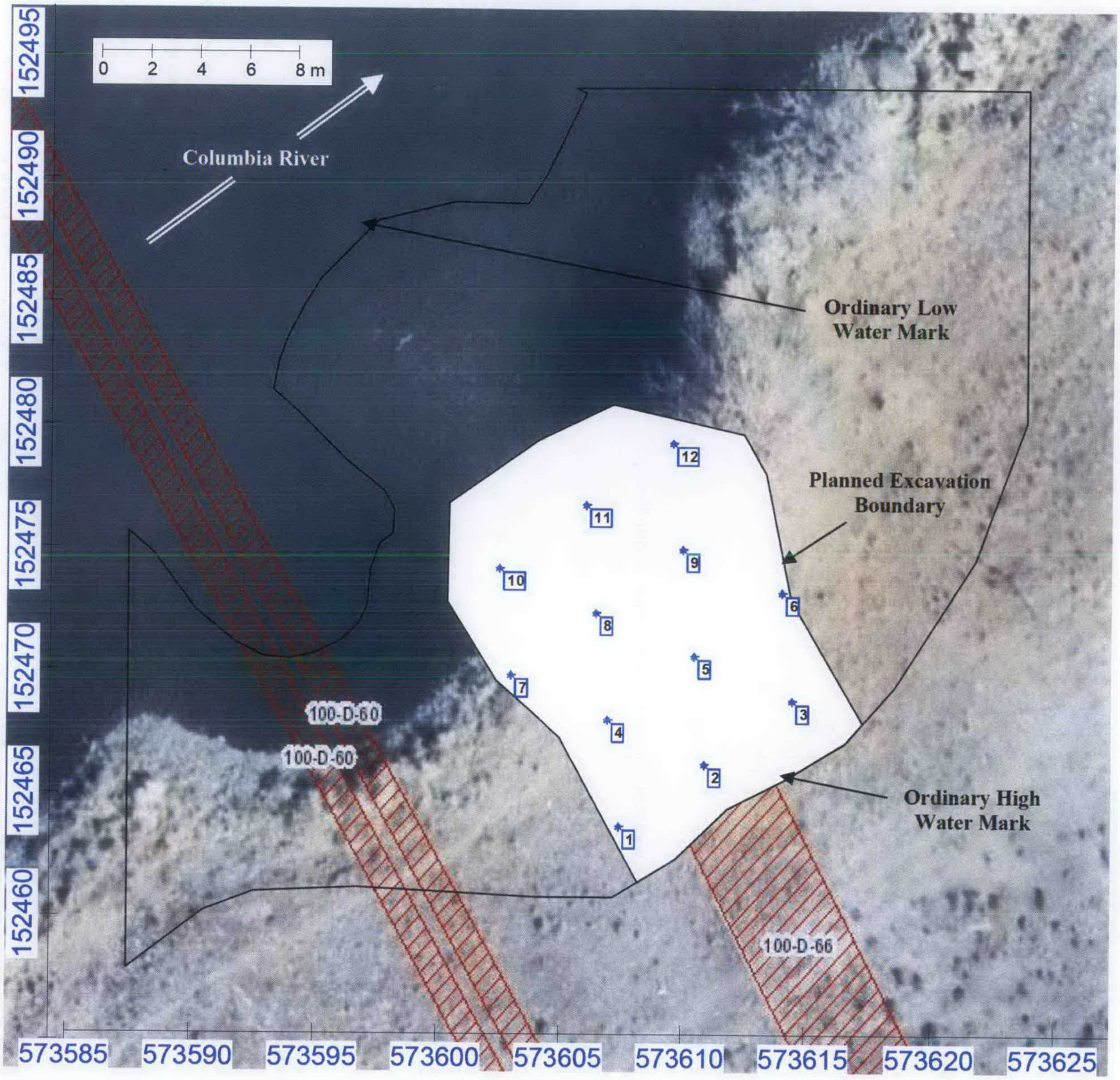


Table 2. 100-D-66 Upland Segment Verification Sample Summary Table.

Sample Location	HEIS Sample Number	Washington State Plane Coordinates		Sample Analysis
		Easting	Northing	
Excavation				
A-1	J1PXJ0	573636.8	152404.4	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOAs, IC anions, NO_2/NO_3, PAH, pesticides, GEA, strontium-90, isotopic uranium, nickel-63, carbon-14, and isotopic plutonium
A-2	J1PXJ1	573642.6	152414.9	
A-3	J1PXJ2	573630.6	152414.7	
A-4	J1PXJ3	573636.4	152425.2	
A-5	J1PXJ4	573642.1	152435.7	
A-6	J1PXJ5	573618.6	152414.4	
A-7	J1PXJ6	573624.4	152424.9	
A-8	J1PXJ7	573630.1	152435.5	
A-9	J1PXJ8	573635.9	152446.0	
A-10	J1PXJ9	573618.1	152435.2	
A-11	J1PXK0	573623.9	152445.7	
A-12	J1PXK1	573617.6	152456.0	
Duplicate of J1PXK0 [b]	J1PXK2	573623.9	152445.7	
Waste Staging Area Footprints				
B-1	J1PXK3	573714.5	152334.0	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOAs, IC anions, NO_2/NO_3, PAH, pesticides, GEA, strontium-90, isotopic uranium, nickel-63, carbon-14, and isotopic plutonium
B-2	J1PXK4	573723.7	152342.2	
B-3	J1PXK5	573732.8	152350.4	
B-4	J1PXK6	573712.0	152346.0	
B-5	J1PXK7	573721.1	152354.2	
B-6	J1PXK8	573730.3	152362.4	
B-7	J1PXK9	573709.5	152358.0	
B-8	J1PXL0	573557.2	152307.0	
B-9	J1PXL1	573566.3	152315.2	
B-10	J1PXL2	573575.5	152323.4	
B-11	J1PXL3	573554.6	152319.0	
B-12	J1PXL4	573563.8	152327.3	
Duplicate of J1PXL0 [b]	J1PXL5	573557.2	152307.0	
Equipment blank	J1PXL6	NA	NA	ICP metals [a], mercury, and PAH

[a] Analysis was performed for the expanded list of ICP metals including antimony, arsenic, barium, beryllium, boron, cadmium, chromium(total), cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc.
[b] Duplicate soil samples were collected at a location selected at the project analytical lead's discretion.

GEA = gamma energy analysis
HEIS = Hanford Environmental Information System
IC = ion chromatography
ICP = inductively coupled plasma
NA = not applicable
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOA = semivolatile organic analysis

Table 3. 100-D-66 Verification Sample Summary Table (Shoreline Segment).

Sample Location	HEIS Sample Number	Sample Date	Washington State Plane Coordinates		Sample Analysis
			Easting	Northing	
1	J1M6V8	11/18/2011	573607.4	152463.7	ICP metals [a], mercury, hexavalent chromium, IC anions, nitrite/nitrate [b], pH, PAHs, PCBs, SVOAs, pesticides, GEA, carbon-14, nickel-63, strontium-90, isotopic plutonium, isotopic uranium, tritium
2	J1M6V9	11/18/2011	573610.9	152466.3	
3	J1M6W0	11/18/2011	573614.4	152468.9	
4	J1M6W1	11/18/2011	573606.9	152468.1	
5	J1M6W2	11/18/2011	573610.4	152470.7	
6	J1M6W3	11/18/2011	573614.0	152473.2	
7	J1M6W4	11/18/2011	573602.9	152469.9	
8	J1M6W5	11/18/2011	573606.4	152472.4	
9	J1M6W6	11/18/2011	573610.0	152475.0	
10	J1M6W7	11/18/2011	573602.4	152474.2	
11	J1M6W8	11/18/2011	573606.0	152476.8	
12	J1M6W9	11/18/2011	573609.5	152479.4	
Duplicate of J1M6V9	J1M6X0	11/18/2011	573610.9	152466.3	
Equipment Blank	J1M6X1	11/18/2011	NA	NA	ICP metals [a], mercury, SVOA

[a] Analysis was performed for the expanded list of ICP metals to include antimony, arsenic, barium, beryllium, boron, cadmium, chromium(total), cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc.

GEA = gamma energy analysis
HEIS = Hanford Environmental Information System
IC = ion chromatography
ICP = inductively coupled plasma
NA = not applicable
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOA = semivolatile organic analysis
TBD = to be determined

Table 4. Comparison of the Maximum or Statistical Contaminant Concentrations to Action Levels for the 100-D-66 Excavation Verification Samples. (2 Pages)

COPC	Statistical Result [a] (pCi/g)	Soil Lookup Values (pCi/g) [b] Shallow Zone Lookup Value	Soil Lookup Value for Groundwater Protection	Soil Lookup Value for River Protection	Does the Result Exceed Lookup Values?	Do the Results Pass RESRAD Modeling?
Carbon-14	1.20	8.69	-- [c]	-- [c]	No	--
Cesium-137	0.823 (<BG)	6.2	1,465	2,930	No	--
Europium-152	0.565	3.3	-- [c]	-- [c]	No	--
Europium-154	0.059	3.0	-- [c]	-- [c]	No	--
Nickel-63	5.66	4,013	83	166	No	--
Plutonium-238	0.135	38.8	-- [c]	-- [c]	No	--
Plutonium-239/240	0.659	35.1	-- [c]	-- [c]	No	--
Tritium	3.43	459	12.6	25.2	No	--
Uranium-233/234	0.673 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No	--
Uranium-238	0.638 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No	--
COPC	**Statistical or Maximum Result (mg/kg) [a]**	**Soil Cleanup Levels (mg/kg) [b] Direct Exposure**	**Protective of Groundwater**	**Protective of the River**	**Does the Result Exceed RAGs?**	**Does the Result Pass RESRAD Modeling?**
Arsenic	2.74 (<BG)	20 [d]	20 [d]	20 [d]	No	--
Barium	71.1 (<BG)	5,600	200	400	No	--
Beryllium	0.339 (<BG)	10.4 [e]	1.51 [d]	1.51 [d]	No	--
Boron [f]	1.12	7,200	320	--	No	--
Cadmium [g]	0.0860 (<BG)	13.9 [e]	0.81 [d]	0.81 [d]	No	--
Chromium, total	18.4 (<BG)	80,000	18.5 [d]	18.5 [d]	No	--
Cobalt	6.22 (<BG)	24	15.7 [d]	--	No	--
Copper	13.7 (<BG)	2,960	59.2	22.0 [d]	No	--
Hexavalent chromium [f]	0.43	2.1	4.8	2	No	--
Lead	4.16 (<BG)	353	10.2 [d]	10.2 [d]	No	--
Manganese	268 (<BG)	3,760	512 [d]	512 [d]	No	--
Mercury	0.274 (<BG)	24	0.33 [d]	0.33 [d]	No	--
Molybdenum [f]	0.461	400	8	--	No	--
Nickel	10.8 (<BG)	1,600	19.1 [d]	27.4	No	--
Vanadium	50.5 (<BG)	560	85.1 [d]	--	No	--
Zinc	40.6 (<BG)	24,000	480	67.8 [d]	No	--
Chloride	35.5 (<BG)	--	25,000	--	No	--
Nitrogen in nitrate	31.2	128,000	1,000	2,000	No	--
Nitrogen in nitrite and nitrate	22.3	128,000	1,000	2,000	No	--
Sulfate	264	--	25,000	--	No	--
Acenapthene	0.0190	4,800	96	129	No	--
Acenapthylene [h]	0.0445	4,800	96	129	No	--
Anthracene	0.0108	24,000	240	1,920	No	--
Benzo(a)anthracene	0.0284	1.37	0.015 [i]	0.015 [i]	Yes	Yes [j]
Benzo(a)pyrene	0.0174	0.137	0.015 [i]	0.015 [i]	Yes	Yes [j]
Benzo(b)fluoranthene	0.0154	1.37	0.015 [i]	0.015 [i]	Yes	Yes [j]
Benzo(g,h,i)perylene [h]	0.0127	2,400	48	192	No	--

Table 4. Comparison of the Maximum or Statistical Contaminant Concentrations to Action Levels for the 100-D-66 Excavation Verification Samples. (2 Pages)

COPC	Statistical or Maximum Result (mg/kg) [b]	Soil Cleanup Levels (mg/kg) [a]			Does the Result Exceed RAGs?	Does the Result Pass RESRAD Modeling
		Direct Exposure	Protective of Groundwater	Protective of the River		
Benzo(k)fluoranthene	0.0289	1.37	0.015 [i]	0.015 [i]	Yes	Yes [j]
Chrysene	0.111	13.7	0.12	0.1 [i]	Yes	Yes [j]
Dibenz(a,h)anthracene	0.00674	0.137	0.03 [i]	0.30	No	--
Fluoranthene	0.0387	3,200	64	18.0	No	--
Indeno(1,2,3-cd) pyrene	0.00969	1.37	0.33 [i]	0.33 [i]	No	--
Naphthalene	0.0293	1,600	16.0	988	No	--
Phenanthrene [h]	0.0469	24,000	240	1,920	No	--
Pyrene	0.0328	2,400	48	192	No	--

[a] Lookup values and RAGs obtained from the 100 Area RDR/RAWP (DOE-RL 2009b) unless otherwise noted. Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater.

[b] The statistical or maximum values for each COPC is determined in the 95% UCL calculation, which is located in Appendix D.

[c] No value because the distribution coefficient (K_d) value for this contaminant is greater than 80 mL/g, RESRAD modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b) predicts that the contaminant will show no migration within the 100 Area vadose zone and no impact on groundwater or the Columbia River.

[d] Where cleanup levels are less than background, cleanup levels default to background levels (WAC 173-340-700[4][d]). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009b).

[e] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

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

[g] 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).

[h] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: phenanthrene; surrogate: anthracene

[i] 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.

[j] Residual concentrations of these contaminants have K_d values greater than 80 mL/g and based on RESRAD modeling as discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b) will not migrate within the 100 Area vadose zone and therefore have no impact on groundwater or the Columbia River within 1,000 years.

--	= not applicable	RDL	= required detection limit
BG	= background	RDR/RAWP	= *Remedial Design Report/Remedial Action Work Plan for the 100 Area*
COPC	= contaminant of potential concern	RESRAD	= RESidual RADioactivity (dose assessment model)
EPA	= U.S. Environmental Protection Agency	UCL	= upper confidence limit
RAG	= remedial action goal	WAC	= *Washington Administrative Code*

Table 5. Comparison of the Maximum or Statistical Contaminant Concentrations to Action Levels for the 100-D-66 Waste Staging Area Footprint Verification Samples. (2 Pages)

COPC	Statistical Result [a] (pCi/g)	Soil Lookup Values (pCi/g) [b]			Does the Result Exceed Lookup Values?	Do the Results Pass RESRAD Modeling?
		Shallow Zone Lookup Value	Soil Lookup Value for Groundwater Protection	Soil Lookup Value for River Protection		
Carbon-14	1.54	8.69	-- [c]	-- [c]	No	--
Cesium-137	0.260 (<BG)	6.2	1,465	2,930	No	--
Cobalt-60	0.017	1.4	13,900	27,800	No	--
Europium-152	0.231	3.3	-- [c]	-- [c]	No	--
Europium-154	0.045	3.0	-- [c]	-- [c]	No	--
Nickel-63	1.13	4,013	83	166	No	--
Total beta radiostrontium	0.155 (<BG)	4.5	27.6	55.2	No	--
Uranium-233/234	0.562 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No	--
Uranium-238	0.608 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No	--
COPC	**Statistical or Maximum Result (mg/kg) [a]**	**Soil Cleanup Levels (mg/kg) [b]**			**Does the Result Exceed RAGs?**	**Does the Result Pass RESRAD Modeling?**
		Direct Exposure	**Protective of Groundwater**	**Protective of the River**		
Antimony [e]	0.353 (<BG)	32	5 [d]	5 [d]	No	--
Arsenic	3.04 (<BG)	20 [d]	20 [d]	20 [d]	No	--
Barium	61.5 (<BG)	5,600	200	400	No	--
Beryllium	0.256 (<BG)	10.4 [f]	1.51 [d]	1.51 [d]	No	--
Boron [g]	1.16	7,200	320	--	No	--
Cadmium [e]	0.0840 (<BG)	13.9 [f]	0.81 [d]	0.81 [d]	No	--
Chromium, total	12.5 (<BG)	80,000	18.5 [d]	18.5 [d]	No	--
Cobalt	5.83 (<BG)	24	15.7 [d]	--	No	--
Copper	13.2 (<BG)	2,960	59.2	22.0 [d]	No	--
Lead	3.27 (<BG)	353	10.2 [d]	10.2 [d]	No	--
Manganese	265 (<BG)	3,760	512 [d]	512 [d]	No	--
Mercury	0.0175 (<BG)	24	0.33 [d]	0.33 [d]	No	--
Molybdenum [g]	0.365	400	8	--	No	--
Nickel	10.5 (<BG)	1,600	19.1 [d]	27.4	No	--
Vanadium	48.4 (<BG)	560	85.1 [d]	--	No	--
Zinc	37.6 (<BG)	24,000	480	67.8 [d]	No	--
Chloride	7.8 (<BG)	--	25,000	--	No	--
Fluoride	2.8 (<BG)	4,800	96	400	No	--
Nitrogen in nitrate	13.9	128,000	1,000	2,000	No	--
Nitrogen in nitrite and nitrate	17.4	128,000	1,000	2,000	No	--
Sulfate	63.4 (<BG)	--	25,000	--	No	--
Acenapthene	0.0114	4,800	96	129	No	--
Acenapthylene [h]	1.320	4,800	96	129	No	--
Benzo(a)anthracene	0.00581	1.37	0.015 [i]	0.015 [i]	No	--
Benzo(a)pyrene	0.0105	0.137	0.015 [i]	0.015 [i]	No	--
Benzo(b)fluoranthene	0.00472	1.37	0.015 [i]	0.015 [i]	No	--
Benzo(g,h,i)perylene [h]	0.00394	2,400	48	192	No	--
Benzo(k)fluoranthene	0.00451	1.37	0.015 [i]	0.015 [i]	No	--

Table 5. Comparison of the Maximum or Statistical Contaminant Concentrations to Action Levels for the 100-D-66 Waste Staging Area Footprint Verification Samples. (2 Pages)

COPC	Statistical or Maximum Result (mg/kg) [b]	Soil Cleanup Levels (mg/kg) [a]			Does the Result Exceed RAGs?	Does the Result Pass RESRAD Modeling
		Direct Exposure	Protective of Groundwater	Protective of the River		
Chrysene	0.00720	13.7	0.12	0.1 [h]	No	--
Fluorene	0.00978	3,200	64	260	No	--
Fluoranthene	0.00951	3,200	64	18.0	No	--
Indeno(1,2,3-cd) pyrene	0.00363	1.37	0.33 [i]	0.33 [i]	No	--
Naphthalene	0.0203	1,600	16.0	988	No	--
Phenanthrene [h]	0.0155	24,000	240	1,920	No	--
Pyrene	0.00755	2,400	48	192	No	--

[a] Lookup values and RAGs obtained from the 100 Area RDR/RAWP (DOE-RL 2009b) unless otherwise noted. Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater.

[b] The statistical or maximum values for each COPC is determined in the 95% UCL calculation, which is located in Appendix D.

[c] No value because the distribution coefficient (K_d) value for this contaminant is greater than 80 mL/g, RESRAD modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b) predicts that the contaminant will show no migration within the 100 Area vadose zone, and no impact on groundwater or the Columbia River.

[d] Where cleanup levels are less than background, cleanup levels default to background levels (WAC 173-340-700[4][d]). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009b).

[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] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

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

[h] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: phenanthrene; surrogate: anthracene

[i] 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	RDL	= required detection limit
BG	= background	RDR/RAWP	= *Remedial Design Report/Remedial Action Work Plan for the 100 Area*
COPC	= contaminant of potential concern	RESRAD	= RESidual RADioactivity (dose assessment model)
EPA	= U.S. Environmental Protection Agency	UCL	= upper confidence limit
RAG	= remedial action goal	WAC	= *Washington Administrative Code*

Evaluation of the verification sampling results in Tables 3 and 4 show that all direct exposure, groundwater protection, and Columbia River protection cleanup levels are met for all areas of the upland segment of the 100-D-66 waste site with the exception of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene within the excavation. However, residual concentrations of these contaminants all have distribution coefficient (K_d) values greater than 80 mL/g and based on RESidual RADioactivity (RESRAD) modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b) will not migrate within the 100 Area vadose zone and therefore have no impact on groundwater or the Columbia River within 1,000 years. Therefore, residual concentrations of these constituents are predicted to be protective of groundwater and the Columbia River.

Table 6 provides a comparison of the maximum sample results (Appendix E) for sediment samples collected from the shoreline segment against upland soil RAGs. This comparison is provided for information, but is not presented for making cleanup decisions concerning the shoreline, located below the OHWM. The sediment sample results collected within the remediated shoreline segment exceed upland soil RAGs for chromium (total), lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and carbon-14. However, no further remediation of the-below-OHWM portion of the 100-D-66 waste site using the remove, treat, and dispose (RTD) remedy is recommended because interim action soil RAGs are not appropriately applied to sediments collected below the OWHM and the Remaining Sites ROD (EPA 1999) does not provide in-water cleanup levels for sediment.

Table 6. Comparison of the Maximum Contaminant Concentrations to Action Levels for the 100-D-66 Waste Site Shoreline Segment Verification Sediment Samples. (2 Pages)

COPC	Maximum Result (pCi/g)	Soil Lookup Values (pCi/g) [a]			Does the Result Exceed Lookup Values?
		Shallow Zone Lookup Value	Soil Lookup Value for Groundwater Protection	Soil Lookup Value for River Protection	
Carbon-14	17	8.69	-- [b]	-- [b]	Yes [j]
Cesium-137	0.47 (<BG)	6.2	1,465	2,930	No
Europium-152	0.639	3.3	-- [b]	-- [b]	No
Nickel-63	26.7	4,013	83	166	No
Total beta radiostrontium	0.237	4.5	27.6	55.2	No
Tritium	0.101	459	12.6	25.2	No
Uranium-234	1.34 (0.24) [c]	1.1 [d]	1.1 [d]	1.1 [d]	No
Uranium-238	0.959 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No
COPC	**Maximum Result (mg/kg)**	**Soil Cleanup Levels (mg/kg)[a]**			**Does the Result Exceed RAGs?**
		Direct Exposure	**Protective of Groundwater**	**Protective of the River**	
Antimony [e]	1.5 (<BG)	32	5 [d]	5 [d]	No
Arsenic	6.4 (<BG)	20 [d]	20 [d]	20 [d]	No
Barium	139	5,600	200	400	No
Beryllium	0.56 (<BG)	10.4 [f]	1.51 [d]	1.51 [d]	No
Cadmium [e]	0.74 (<BG)	13.9 [f]	0.81 [d]	0.81 [d]	No
Chromium, total	48.5	80,000	18.5 [d]	18.5 [d]	Yes [j]
Hexavalent chromium [g]	1.9	2.1 [f]	4.8	2	No
Cobalt	9.1 (<BG)	24	15.7 [d]	--	No
Copper	20.2 (<BG)	2,960	59.2	22.0 [d]	No
Lead	14	353	10.2 [d]	10.2 [d]	Yes [j]
Manganese	388 (<BG)	3,760	512 [d]	512 [d]	No
Mercury	0.057 (<BG)	24	0.33 [d]	0.33 [d]	No
Nickel	15.3 (<BG)	1,600	19.1 [d]	27.4	No
Vanadium	55.5 (<BG)	560	85.1 [d]	-- [h]	No
Zinc	141	24,000	480	67.8 [d]	Yes [j]
Nitrogen in nitrate	8.2 (<BG)	128,000	1,000	2,000	No
Nitrogen in nitrite and nitrate	4.8	128,000	1,000	2,000	No
Sulfate	30 (<BG)	--	25,000	--	No

Table 6. Comparison of the Maximum Contaminant Concentrations to Action Levels for the 100-D-66 Waste Site Shoreline Segment Verification Sediment Samples. (2 Pages)

COPC	Maximum Result (mg/kg)	Soil Cleanup Levels (mg/kg)[a]			Does the Result Exceed RAGs?
		Direct Exposure	Protective of Groundwater	Protective of the River	
Acenaphthene	0.270	4,800	96	129	No
Benzo(a)anthracene	0.990	1.37	0.015[h]	0.015[h]	Yes[j]
Benzo(a)pyrene	1.100	0.137	0.015[h]	0.015[h]	Ycs[j]
Benzo(b)fluoranthene	1.100	1.37	0.015[h]	0.015[h]	Yes[j]
Benzo(ghi)perylene[i]	0.440	2,400	48	192	No
Benzo(k)fluoranthene	0.650	1.37	0.015[h]	0.015[h]	Yes[j]
Chrysene	1.000	13.7	0.12	0.1[h]	No
Dibenz(a,h)anthracene	0.110	0.137	0.03[h]	0.03[h]	Yes[j]
Fluoranthene	0.560	3,200	64	18.0	No
Indeno(1,2,3-cd)pyrene	0.570	1.37	0.33	0.33	Yes[j]
Phenanthrene[i]	0.026	24,000	240	1,920	No
Pyrene	0.880	2,400	48	192	No
Dimethyl phthalate	0.180	80,000	1,600	14,400	No
4-4'-DDE	0.00097	2.94	0.0257	0.0033[h]	No

[a] Lookup values and RAGs obtained from the 100 Area RDR/RAWP (DOE-RL 2009b) unless otherwise noted. Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater.

[b] No value because the distribution coefficient (K_d) value for this contaminant is greater than 80 mL/g, RESRAD modeling discussed in Appendix C of the 100 Area RDR/RAWP (DOE-RL 2009b) predicts that the contaminant will show no migration within the 100 Area vadose zone and no impact on groundwater or the Columbia River.

[c] With subtraction of the background concentration of uranium-234, the resultant value (i.e., 0.24 pCi/g) is below the soil concentration representing 15 mrem/yr above background (i.e., 0.58 pCi/g). Consequently, the result is less than the 15 mrem/yr above background cleanup level.

[d] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009b).

[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] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

[g] No Hanford Site-specific or Washington State background value is available.

[h] Where cleanup levels are less than RDLs, cleanup levels default to RDLs (DOE-RL 2009b) per WAC 173-340-707(2) (Ecology 1996).

[i] Toxicity data for this chemical is not available. Cleanup levels are based on surrogate chemicals:
Contaminant: benzo(g,h,i)perlyene; surrogate: pyrene
Contaminant: phenanthrene; surrogate: anthracene

[j] The result exceeds RAGs for upland soil and will be considered as part of future decisions for the Columbia River shoreline.

-- = not applicable
BG = background
COPC = contaminant of potential concern
RAG = remedial action goal
RDL = required detection limit
RDR/RAWP = *Remedial Design Report/Remedial Action Work Plan for the 100 Area*
RESRAD = RESidual RADioactivity (dose assessment model)
WAC = *Washington Administrative Code*

CLEANUP VERIFICATION DATA EVALUATION

This section demonstrates that remedial action at the 100-D-66 waste site has achieved the applicable RAGs developed to support unrestricted land use at the 100-D Area as documented in the 100 Area RDR/RAWP (DOE-RL 2009b).

Three-Part Test for Nonradionuclides

When using a statistical sampling approach, a RAG requirement for nonradionuclides is the WAC 173-340-740(7)(e) three-part test. The WAC 173-340 three-part test consists of the following criteria: (1) the cleanup verification 95% UCL value must be less than the cleanup level, (2) no single detection can 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-66 waste site is included in the statistical calculations (Appendix D). For the statistical data sets, no COPCs fail the "Model Toxics Control Act – Cleanup" three-part test (WAC 173-340, 1996) for the waste staging area footprints, whereas for the excavation decision unit, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chromium fail one or more of the three-part test criteria for protection of groundwater and the Columbia River. However, residual concentrations of these constituents are not predicted to migrate to groundwater within 1,000 years and are, therefore, protective of groundwater and the Columbia River.

An additional application of the three-part test is included for the statistical data sets, which default to the maximum because less than half of the data set was detected. The results of this evaluation indicate that all residual COPC concentrations pass the three-part test, with the exception of benzo(k)fluoranthene and chrysene having a maximum concentration exceeding the cleanup criteria for groundwater and river protection. However, residual concentrations of these constituents are not predicted to migrate to groundwater within 1,000 years and are, therefore, protective of groundwater and the Columbia River.

Direct Contact Noncarcinogenic Hazard Quotient Remedial Action Goal

Assessment of the risk requirements for the upland portion of the 100-D-66 waste site was determined by calculation of the hazard quotient and excess carcinogenic risk. The 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 excess carcinogenic risk of less than 1×10^{-5}. Hazard quotient and excess carcinogenic risk calculations for direct contact were conservatively performed for the 100-D-66 waste site using the highest of the statistical or maximum values from all areas. Risk values were not calculated for constituents that were not detected or were detected at concentrations below Hanford Site or Washington State background values. All individual hazard quotients are below 1.0, and all individual excess carcinogenic risk values are below 1×10^{-6}. The direct contact cumulative hazard quotient for the 100-D-66 waste site is 3.7×10^{-3}, and the cumulative excess carcinogenic risk value is 4.0×10^{-7}, satisfying the criteria of less than 1.0 and less than 1×10^{-5}, respectively. Therefore, the nonradionuclide risk requirements are met.

Hazard Quotient and Carcinogenic Risk Calculation for Groundwater

Assessment of the risk requirements for the upland portion of the 100-D-66 waste site 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_ds 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 100 Area RDR/RAWP (DOE-RL 2009b). The cumulative hazard quotient is 1.8×10^{-1}, which is less than 1.0. No carcinogenic constituents required evaluation for groundwater protection. Therefore, nonradionuclide risk requirements related to groundwater are met.

Attainment of Radionuclide Direct Exposure RAGs

Evaluation of the radionuclide cleanup verification results (Tables 4 and 5) indicates that all samples were below lookup values. Evaluation of direct exposure RAG attainment for radionuclides was performed using the single-radionuclide dose-equivalence lookup values to do sum of fractions evaluations. The model used to develop these dose-equivalence lookup values is presented in the 100 Area RDR/RAWP (DOE-RL 2009b).

Table 7 compares the radionuclide cleanup verification results above background from the highest values of the both the excavation and waste staging area footprint verification samples to direct exposure single radionuclide 15 mrem/yr dose-equivalence values and shows the sum-of-fractions evaluation for comparison of the total radionuclide dose to the RAG of 15 mrem/yr above background. The columns on the left side of the table are the COPCs and the radionuclide activities for the samples, with uranium values corrected for background, as appropriate. The third column presents the single radionuclide 15 mrem/yr dose-equivalence activities, and the last column presents the radionuclide activities divided by the dose-equivalence activities. As demonstrated by the summation of the fractions, the maximum cumulative dose values contributed by the residual radionuclide populations is predicted to be less than the RAG of 15 mrem/yr above background.

Table 7. Attainment of Radionuclide Direct Exposure Remedial Action Goals. (2 Pages)

COC/COPC	95% UCL Statistical Values (pCi/g)	Activity Equivalent to 15 mrem/yr Dose [a] (pCi/g)	Fraction
Carbon-14	1.54	8.69	0.177
Cesium-137	0.823 (<BG)	6.2	0.133
Cobalt-60	0.017	1.4	0.012
Europium-152	0.565	3.3	0.171

Table 7. Attainment of Radionuclide Direct Exposure Remedial Action Goals. (2 Pages)

COC/COPC	95% UCL Statistical Values (pCi/g)	Activity Equivalent to 15 mrem/yr Dose [a] (pCi/g)	Fraction
Europium-154	0.059	3.0	0.020
Nickel-63	5.66	4,013	0.001
Plutonium-238	0.135	38.8	0.003
Plutonium-239/240	0.659	35.1	0.019
Strontium-90	0.155 (<BG)	4.5	0.034
Tritium	3.43	459	0.007
Uranium-233/234	0 (<BG) [b]	0.58	0
Uranium-238	0 (<BG) [b]	0.61	0
		Total	0.579
		Equivalent Dose (mrem/yr)	8.68

[a] Single radionuclide 15 mrem/yr dose-equivalence values and derivation methodology are presented in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2009b).
[b] Background values have been subtracted from the 95% UCL statistical value resulting in no contribution to the sum of fractions for evaluation of dose.

-- = not applicable
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
UCL = upper confidence limit

Potassium-40, radium-226, radium-228, thorium-228, and thorium-232 were detected in samples collected at the site but are not considered in the statistical calculations. These isotopes are excluded from consideration based on natural occurrence and were all detected below background levels (based on an assumption of secular equilibrium, the background activities for radium-228 and thorium-228 are equal to the statistical background activity of 1.32 pCi/g for thorium-232) (DOE-RL 2009a).

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the verification sampling approach, the field logbooks, and resulting analytical data with the sampling and data requirements specified by the project objectives and performance specifications. This review involves an 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) and completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process (EPA 2006). This DQA was performed in accordance with site-specific data quality objectives found in the SAP (DOE-RL 2009a).

The DQA for the 100-D-66 waste site established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances. The data set was found to be acceptable for decision-making purposes. 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 ENRE project-specific database for data evaluation prior to archival in HEIS and are summarized in Appendix D. The detailed DQA is presented in Appendix F.

SUMMARY FOR INTERIM CLOSURE

The upland segment of the 100-D-66 waste site has been remediated and evaluated in accordance with the Remaining Sites ROD (EPA 1999) and the 100 Area RDR/RAWP (DOE-RL 2009b). Statistical sampling to verify the completeness of remediation was performed, and analytical results were shown to meet the applicable cleanup 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-66 waste site to Interim Closed Out. Institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

The sediment sample results collected within the remediated shoreline segment exceed upland soil RAGs. However, no further remediation of the below OHWM portion of the 100-D-66 waste site using the RTD remedy is recommended because interim action soil RAGs are not appropriately applied to sediments collected below the OHWM and the Remaining Sites ROD (EPA 1999) does not provide in-water cleanup levels for sediment.

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APPENDIX A

ECOLOGICAL RISK COMPARISON TABLE

Table A-1. Maximum or Statistical Contaminant Concentrations that Exceed Ecological Screening Levels for the 100-D-66 Waste Site [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	0.353 (<BG)
Boron	--	0.5	--	--	--	--	--	--	1.16
Manganese	512	1,100 [d]	--	1,500	220	450	4,300	4,000	268 (<BG)
Mercury, inorganic	0.33	0.3	0.1	5.5	--	--	--	--	0.274 (<BG)
Vanadium	85.1	2	--	--	--	--	7.8	280	50.5 (<BG)

NOTE Shaded cells indicate screening values that are exceeded.

[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 Columbia River corridor portion of the Hanford Site, which will include a more complete quantitative ecological risk assessment.

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

[c] Wildlife.

[d] Benchmark replaced by Washington State natural background concentration.

-- = not available
BG = background
EPA = U.S. Environmental Protection Agency
RDR/RAWP = *Remedial Design Report/Remedial Action Work Plan for the 100 Area*
WAC = *Washington Administrative Code*

APPENDIX B

RADIOLOGICAL SURVEY RESULTS

Figure B-1. 2003 Radiological Survey of the 100-D Area Shoreline.

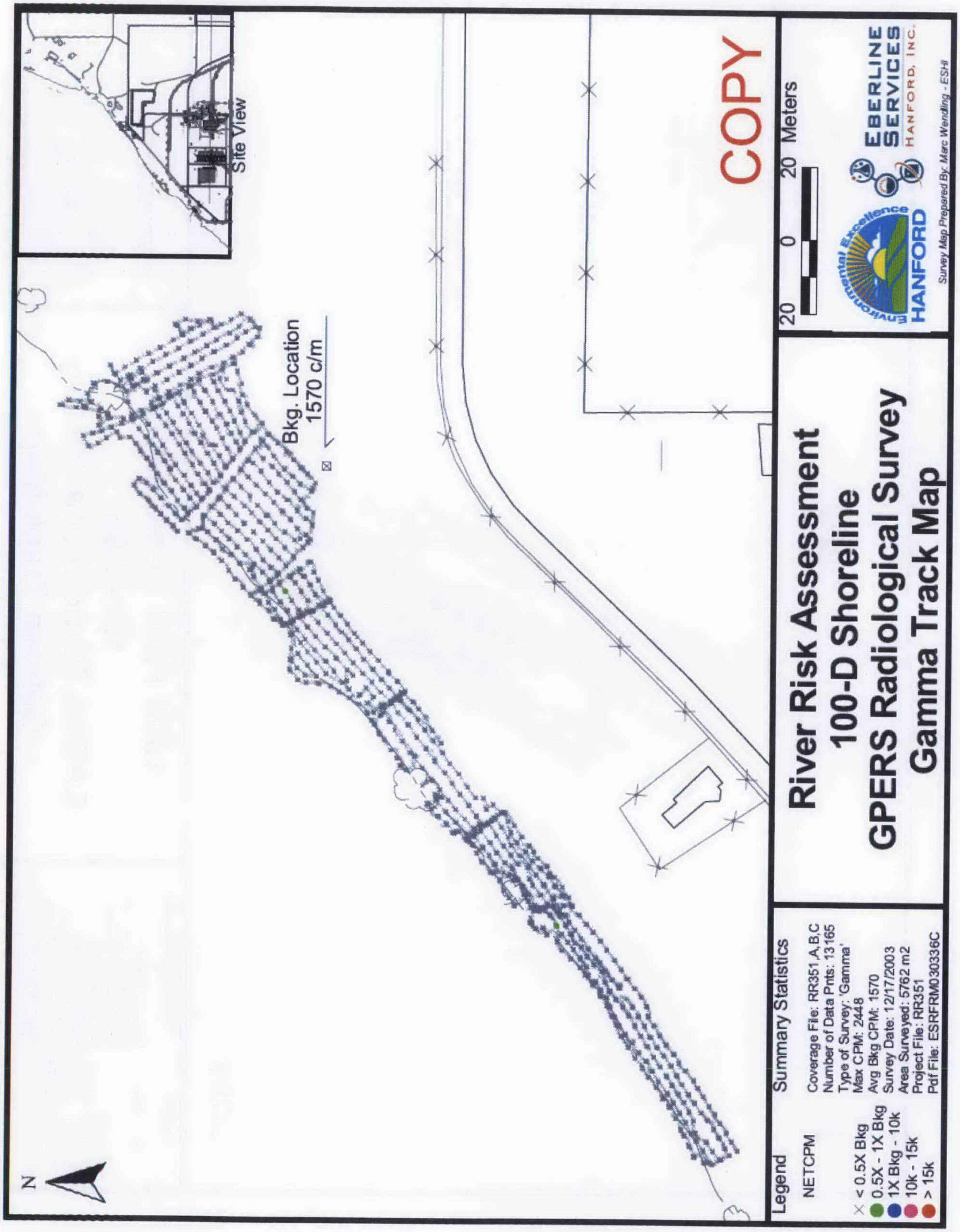


Figure B-2. Pre-Excavation Radiological Survey of the 100-D-66 Waste Site.

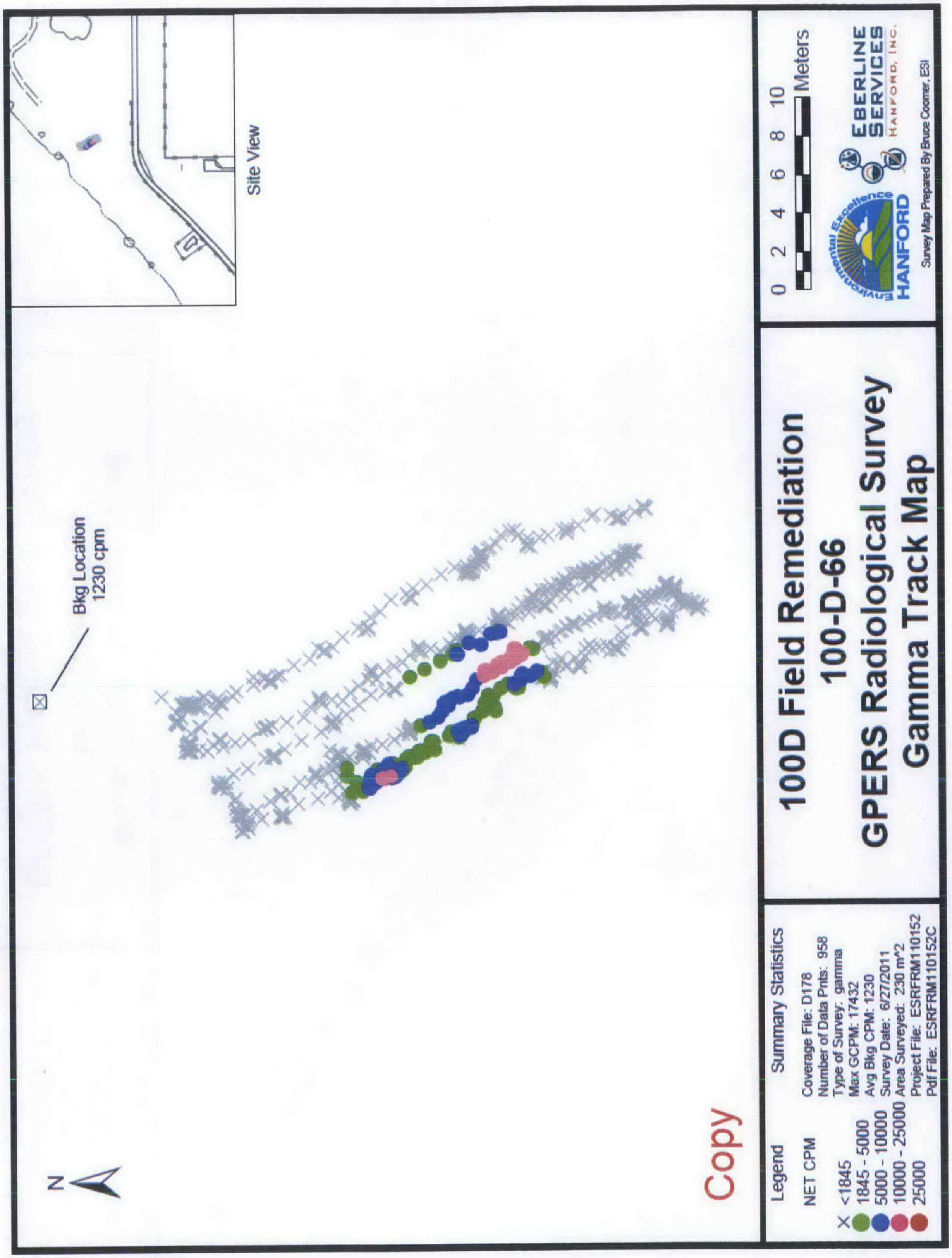
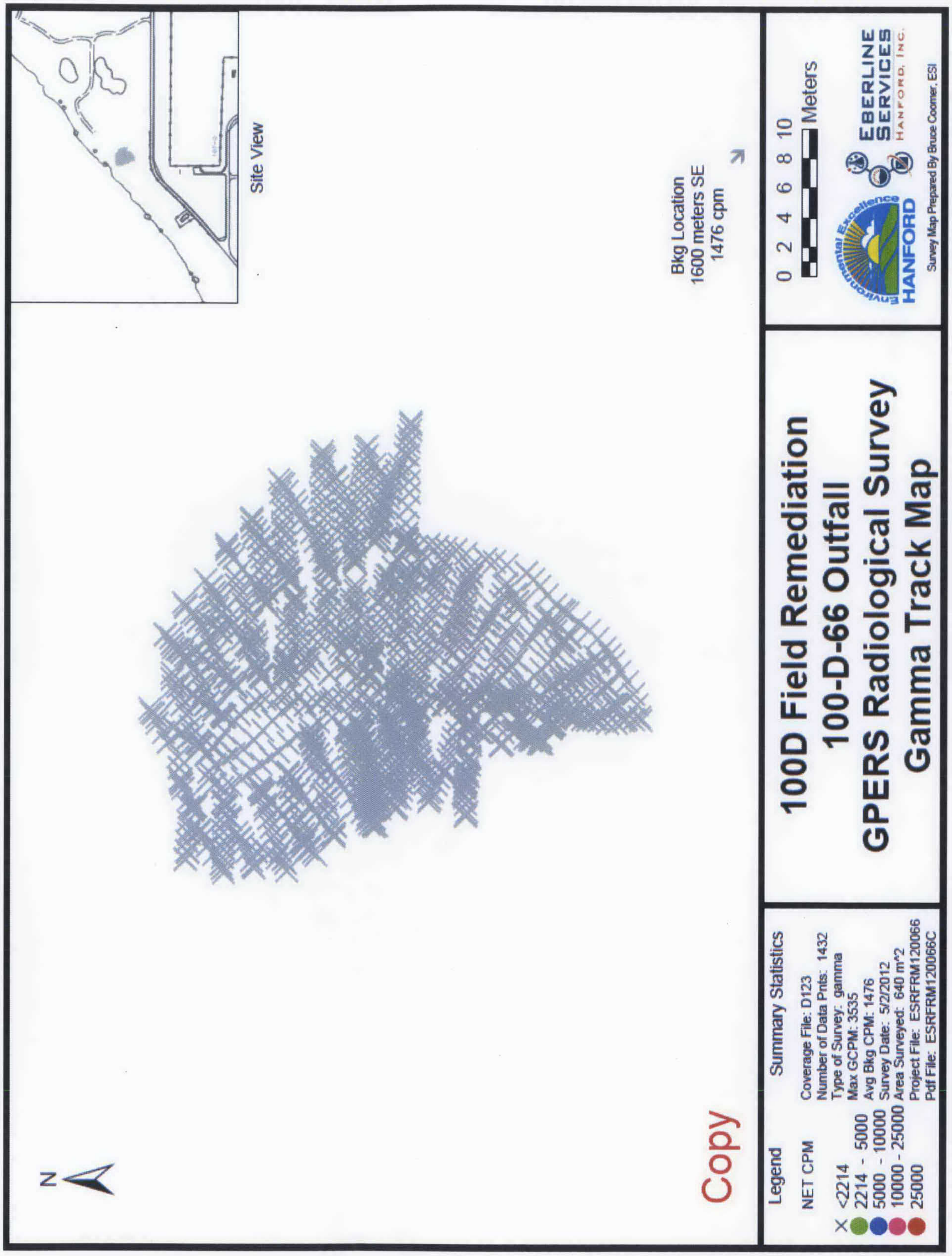


Figure B-3. Post-Excavation Radiological Survey Map.



APPENDIX C

CONFIRMATORY SAMPLING AND IN-PROCESS SAMPLE RESULTS

Table C-1. 100-D-66 Confirmatory Data Results. (3 Pages)

Sample Location	HEIS Number	Sample Date	Americium-241 GEA			Cesium-137			Cobalt-60			Europium-152			Europium-154		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Spillway floor	J10VL7	1/9/06	0.54	U	0.54	4.19		0.35	20.2		0.21	74.1		0.79	6.61		0.72
Duplicate of J10VL7	J10VL8	1/9/06	1.0	U	1.0	3.71		0.27	18.8		0.16	73.3		0.66	6.84		0.56

Sample Location	HEIS Number	Sample Date	Europium-155			Gross Alpha			Gross Beta			Potassium-40			Radium-226		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Spillway floor	J10VL7	1/9/06	0.65	U	0.65	1.98	U	4.1	75.8		5.6	6.53		0.78	0.772		0.52
Duplicate of J10VL7	J10VL8	1/9/06	0.67	U	0.67	2.79	U	3.9	89.4		5.5	9.74		0.81	0.421		0.42

Sample Location	HEIS Number	Sample Date	Radium-228			Thorium-228			Thorium-232			Total Beta Radiostrontium			Uranium-233/234		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Spillway floor	J10VL7	1/9/06	1.2	U	1.2	0.30	U	0.30	1.2	U	1.2	0.864		0.23	0.440		0.031
Duplicate of J10VL7	J10VL8	1/9/06	0.98	U	0.98	0.351		0.24	0.98	U	0.98	0.707		0.21	0.605		0.026

Sample Location	HEIS Number	Sample Date	Uranium-235			Uranium-235 GEA			Uranium-238			Uranium-238 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Spillway floor	J10VL7	1/9/06	0.012		0.030	0.79	U	0.79	0.391		0.025	36	U	36
Duplicate of J10VL7	J10VL8	1/9/06	0.037		0.025	0.76	U	0.76	0.602		0.026	31	U	31

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

Note: Data qualified with C or J are considered acceptable values.

B= detected below reporting limit

C = blank contamination

HEIS = Hanford Environmental Information System

GEA = gamma energy analysis

J = estimated

MDA = minimum detectable activity

N = spike and/or spike duplicate sample recovery is outside control limits

PQL = practical quantitation limit

Q = qualifier

U = undetected

X (metals) = interferences present

X (organics) = more than 40% difference between columns, lower result reported

Table C-1. 100-D-66 Confirmatory Data Results. (3 Pages)

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Spillway floor	J10VL7	1/9/06	7590		6.0	1.3	UJ	1.3	3.2		1.1	187		0.07	0.16		0.03	1.9		0.88
Duplicate of J10VL7	J10VL8	1/9/06	7890		5.9	1.3	UJ	1.3	3.0		1.1	201		0.06	0.13		0.03	1.6		0.87
Equipment blank	J10VM0	1/9/06	50.3		1.7	0.37	U	0.37	0.31	U	0.31	2.0		0.02	0.06		0.009	0.25	U	0.25

Sample Location	HEIS Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Spillway floor	J10VL7	1/9/06	4.9		0.23	73200	C	3.9	37.8		0.52	7.4		0.39	34.9		0.39			
Spillway floor	J10VK1*	1/9/06																0.350	UJ	0.350
Duplicate of J10VL7	J10VL8	1/9/06	4.5		0.23	77500	C	3.9	36.5		0.52	7.9		0.39	35.2		0.39			
Duplicate of J10VJ9	J10VK2*	1/9/06																0.350	UJ	0.350
Equipment blank	J10VM0	1/9/06	0.06	U	0.06	28.6	C	1.1	0.15	C	0.15	0.11	U	0.11	0.26		0.11			

*Only analyte was hexavalent chromium.

Sample Location	HEIS Number	Sample Date	Iron			Lead			Magnesium			Manganese			Mercury			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Spillway floor	J10VL7	1/9/06	21200		10.5	6.4		1.0	8260		4.4	332	C	0.07	0.48		0.02	0.43	U	0.43
Duplicate of J10VL7	J10VL8	1/9/06	22000		10.4	6.3		1.0	8460		4.4	334	C	0.06	0.47		0.02	0.42	U	0.42
Equipment blank	J10VM0	1/9/06	1290		3.0	0.35		0.29	9.2		1.3	25.2	C	0.02	0.02	U	0.02	0.12	U	0.12

Sample Location	HEIS Number	Sample Date	Nickel			Potassium			Selenium			Silicon			Silver			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
Spillway floor	J10VL7	1/9/06	21.6		0.43	703		18.1	1.2	U	1.2	3220	J	2.7	1.3	J	0.46	476	C	0.56
Duplicate of J10VL7	J10VL8	1/9/06	22.8		0.42	664		17.9	1.2	U	1.2	2690	J	2.7	0.45	UJ	0.45	514	C	0.55
Equipment blank	J10VM0	1/9/06	0.15		0.12	19.5		5.1	0.33	U	0.33	51.5		0.76	0.13	U	0.13	18.0		0.16

Sample Location	HEIS Number	Sample Date	Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL
Spillway floor	J10VL7	1/9/06	72.1		0.29	459		0.16
Duplicate of J10VL7	J10VL8	1/9/06	78.1		0.29	476		0.16
Equipment blank	J10VM0	1/9/06	0.26		0.08	1.5		0.05

Table C-1. 100-D-66 Confirmatory Data Results. (3 Pages)

Constituents	J10VL7 Spillway Floor Sample Date 1/9/06			J10VL8 Duplicate of J10VL7 Sample Date 1/9/06		
	µg/kg	Q	PQL	µg/kg	Q	PQL
Polychlorinated Biphenyls						
Aroclor-1016	38	UJ	38	38	UJ	38
Aroclor-1221	38	UJ	38	38	UJ	38
Aroclor-1232	38	UJ	38	38	UJ	38
Aroclor-1242	38	UJ	38	38	UJ	38
Aroclor-1248	38	UJ	38	38	UJ	38
Aroclor-1254	38	UJ	38	38	UJ	38
Aroclor-1260	38	UJ	38	38	UJ	38

Table C-2. 100-D-66 In-process Inorganic Sample Results - Inorganics. (5 Pages)

Sample Description	Sample Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1NJT0	2/23/12	5560	X	1.5	0.37	B	0.37	2.2		0.64	66.4	X	0.074	0.64		0.032	0.96	U	0.96
Soil	J1NJT1	2/23/12	4770	X	1.5	0.36	U	0.36	1.9		0.62	63	X	0.071	0.59		0.031	0.92	U	0.92
Soil	J1NJT2	2/23/12	9340	X	1.5	0.37	U	0.37	4.2		0.64	78.5	X	0.074	0.64		0.032	0.95	U	0.95
Soil	J1NJT3	2/23/12	7390	X	1.4	0.35	U	0.35	3.5		0.6	59.4	X	0.069	0.47		0.03	0.9	U	0.9
Soil	J1NJT4	2/23/12	7340	X	1.5	0.37	U	0.37	3.6		0.63	58.5	X	0.073	0.56		0.032	0.94	U	0.94
Soil	J1NJT5	2/23/12	7050	X	1.4	0.35	U	0.35	3.4		0.6	60.1	X	0.069	0.43		0.03	0.9	U	0.9
Soil	J1NJT6	2/23/12	7950	X	1.5	0.36	U	0.36	3.1		0.62	55.5	X	0.071	0.56		0.031	0.92	U	0.92
Soil	J1NJT7	2/23/12	8300	X	1.6	0.39	U	0.39	3.2		0.68	67.1	X	0.078	0.75		0.034	1	U	1
Soil	J1NJT8	2/23/12	6240	X	1.7	0.4	U	0.4	2.7		0.7	56.1	X	0.081	0.69		0.035	1	U	1
Soil	J1NJT9	2/23/12	7500	X	1.4	0.34	U	0.34	2.9		0.6	76.1	X	0.069	0.7		0.03	0.88	U	0.88
Soil	J1NJV0	2/23/12	7670	X	1.6	0.38	U	0.38	3.4		0.66	73.1	X	0.076	0.66		0.033	0.98	U	0.98
Soil	J1NJV1	2/23/12	6420	X	1.5	0.36	U	0.36	2.4		0.63	59	X	0.073	0.68		0.032	0.94	U	0.94
Soil	J1P1V2	5/3/12	5860		1.5	0.5	B	0.36	2.9		0.62	72.1		0.072	0.64		0.031	0.93	U	0.93
Soil	J1P1V3	5/3/12	8230		1.6	0.4	U	0.4	3.4		0.69	82.8		0.08	0.53		0.035	1	U	1
Soil	J1P1V4	5/3/12	6740		1.4	0.35	U	0.35	2.6		0.61	60.9		0.07	0.51		0.03	0.9	U	0.9
Soil	J1P1V5	5/3/12	9100		1.5	0.36	U	0.36	3.6		0.63	132		0.072	1.4		0.16	0.93	U	0.93
Soil	J1P1V6	5/3/12	9600		1.5	0.36	U	0.36	3.6		0.63	81.3		0.073	0.71		0.032	0.94	U	0.94
Soil	J1P1V7	5/3/12	8020		1.4	0.35	U	0.35	4		0.61	60.7		0.07	0.58		0.03	0.9	U	0.9
Soil	J1P1V8	5/3/12	8410		1.5	0.36	U	0.36	3.9		0.63	59.3		0.073	0.5		0.032	0.94	U	0.94
Soil	J1P1V9	5/3/12	6800		1.6	0.4	U	0.4	3.8		0.69	62.6		0.08	0.64		0.035	1	U	1
Soil	J1P1W0	5/3/12	7070		1.6	0.39	U	0.39	3.9		0.68	63.9		0.078	0.67		0.034	1	U	1
Soil	J1P1W1	5/3/12	8100		1.4	0.35	U	0.35	3.5		0.61	67.8		0.071	0.68		0.031	0.91	U	0.91

Table C-2. 100-D-66 In-process Inorganic Sample Results - Inorganics. (5 Pages)

Sample Description	Sample Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1NJT0	2/23/12	0.057	B	0.04	6210	X	13.8	8.6	X	0.057	7.6	X	0.098	14.5	X	0.21	0.155	U	0.155
Soil	J1NJT1	2/23/12	0.038	U	0.038	5490	X	13.2	6.6	X	0.054	7.1	X	0.094	13.4	X	0.2	0.155	U	0.155
Soil	J1NJT2	2/23/12	0.13	B	0.04	4860	X	13.7	19.3	X	0.056	6.3	X	0.097	16.1	X	0.21	0.201		0.155
Soil	J1NJT3	2/23/12	0.037	U	0.037	2790	X	12.9	13.1	X	0.053	4.6	X	0.091	12.8	X	0.2	0.155	U	0.155
Soil	J1NJT4	2/23/12	0.058	B	0.039	7490	X	13.6	11.5	X	0.056	6.4	X	0.096	15.1	X	0.21	0.155	U	0.155
Soil	J1NJT5	2/23/12	0.039	B	0.037	2530	X	12.9	14.9	X	0.053	4.3	X	0.091	12.2	X	0.2	0.155	U	0.155
Soil	J1NJT6	2/23/12	0.17	B	0.039	5250	X	13.2	28.6	X	0.054	4.9	X	0.094	12.2	X	0.2	0.155	U	0.155
Soil	J1NJT7	2/23/12	0.046	B	0.042	10200	X	14.5	11.2	X	0.06	8.3	X	0.1	19.1	X	0.22	0.155	U	0.155
Soil	J1NJT8	2/23/12	0.049	B	0.044	9890	X	15	8.7	X	0.062	7.9	X	0.11	17.9	X	0.23	0.155	U	0.155
Soil	J1NJT9	2/23/12	0.037	U	0.037	5920	X	12.7	8.1	X	0.052	7.9	X	0.09	16.6	X	0.2	0.155	U	0.155
Soil	J1NJV0	2/23/12	0.056	B	0.041	6340	X	14.1	9.9	X	0.058	7.7	X	0.1	16.7	X	0.22	0.155	U	0.155
Soil	J1NJV1	2/23/12	0.058	B	0.039	5600	X	13.5	6.9	X	0.056	7.8	X	0.096	16.4	X	0.21	0.155	U	0.155
Soil	J1P1V2	5/3/12	0.039	U	0.039	5830		13.3	10.1	X	0.055	8.1	X	0.094	15.5		0.2	0.155	U	0.155
Soil	J1P1V3	5/3/12	0.056	B	0.043	3660		14.8	14.3	X	0.061	5.8	X	0.1	15.2		0.23	0.155	U	0.155
Soil	J1P1V4	5/3/12	0.038	U	0.038	3150		13	15.7	X	0.053	5	X	0.092	13.8		0.2	0.155	U	0.155
Soil	J1P1V5	5/3/12	0.039	U	0.039	6030		13.4	24.7	X	0.055	10	X	0.47	20.7		1	0.219		0.155
Soil	J1P1V6	5/3/12	0.039	U	0.039	5770		13.5	11.7	X	0.055	7.5	X	0.095	16.1		0.21	0.155	U	0.155
Soil	J1P1V7	5/3/12	0.045	B	0.038	4850		13	16.8	X	0.053	5.6	X	0.092	14.1		0.2	0.155	U	0.155
Soil	J1P1V8	5/3/12	0.039	U	0.039	4130		13.5	19.1	X	0.055	5.1	X	0.095	13.5		0.21	0.155	U	0.155
Soil	J1P1V9	5/3/12	0.043	U	0.043	7570		14.8	10.4	X	0.061	7.1	X	0.1	17		0.23	0.155	U	0.155
Soil	J1P1W0	5/3/12	0.072	B	0.042	8550		14.5	10.3	X	0.06	8.8	X	0.1	19.7		0.22	0.155	U	0.155
Soil	J1P1W1	5/3/12	0.038	U	0.038	7300		13.1	10.1	X	0.054	7.8	X	0.093	17.8		0.2	0.155	U	0.155

Table C-2. 100-D-66 In-process Inorganic Sample Results - Inorganics. (5 Pages)

Sample Description	Sample Number	Sample Date	Iron			Lead			Magnesium			Manganese			Mercury			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1NJT0	2/23/12	21400	X	3.7	3.1		0.26	4360	X	3.6	305	X	0.098	0.0053	U	0.005	0.25	U	0.25
Soil	J1NJT1	2/23/12	19900	X	3.6	2.5		0.25	4010	X	3.5	263	X	0.094	0.0054	U	0.005	0.24	U	0.24
Soil	J1NJT2	2/23/12	19700	X	3.7	5.9		0.26	5510	X	3.6	272	X	0.097	0.3		0.005	0.25	U	0.25
Soil	J1NJT3	2/23/12	14700	X	3.5	3.9		0.25	5060	X	3.4	244	X	0.091	0.0051	U	0.005	0.24	U	0.24
Soil	J1NJT4	2/23/12	18300	X	3.7	3.9		0.26	4720	X	3.6	240	X	0.096	0.025		0.006	0.25	U	0.25
Soil	J1NJT5	2/23/12	14200	X	3.5	3.8		0.25	4930	X	3.4	228	X	0.091	0.013	B	0.006	0.24	U	0.24
Soil	J1NJT6	2/23/12	15600	X	3.6	3.6		0.25	5680	X	3.5	249	X	0.094	0.048		0.005	0.24	U	0.24
Soil	J1NJT7	2/23/12	24400	X	3.9	4.4		0.28	5530	X	3.8	307	X	0.1	0.013	B	0.006	0.27	U	0.27
Soil	J1NJT8	2/23/12	23600	X	4	3.5		0.29	5070	X	3.9	312	X	0.11	0.025		0.006	0.28	U	0.28
Soil	J1NJT9	2/23/12	23400	X	3.4	3.9		0.24	4350	X	3.3	316	X	0.09	0.0056	U	0.006	0.23	U	0.23
Soil	J1NJV0	2/23/12	21600	X	3.8	4		0.27	4540	X	3.7	317	X	0.1	0.0055	U	0.006	0.26	U	0.26
Soil	J1NJV1	2/23/12	22100	X	3.6	3.5		0.26	4150	X	3.5	303	X	0.096	0.0053	U	0.005	0.25	U	0.25
Soil	J1P1V2	5/3/12	22200		3.6	2.9		0.26	4780		3.5	305		0.094	0.0065	U	0.007	0.29	B	0.25
Soil	J1P1V3	5/3/12	16500		4	3.7		0.28	4080		3.9	315		0.1	0.018		0.005	0.27	U	0.27
Soil	J1P1V4	5/3/12	15000		3.5	3.1		0.25	3550		3.4	214		0.092	0.0053	U	0.005	0.24	U	0.24
Soil	J1P1V5	5/3/12	26700		3.6	4.8		1.3	5090		3.5	350		0.095	0.012	B	0.005	0.25	U	0.25
Soil	J1P1V6	5/3/12	22100		3.6	4.8		0.26	5570		3.5	274		0.095	0.013	B	0.006	0.25	U	0.25
Soil	J1P1V7	5/3/12	18400		3.5	4.1		0.25	5510		3.4	261		0.092	0.021		0.005	0.24	U	0.24
Soil	J1P1V8	5/3/12	15600		3.6	4.1		0.26	5790		3.5	247		0.095	0.015	B	0.006	0.25	U	0.25
Soil	J1P1V9	5/3/12	21500		4	3.6		0.28	4970		3.9	277		0.1	0.015	B	0.005	0.27	U	0.27
Soil	J1P1W0	5/3/12	24100		3.9	4		0.28	5320		3.8	317		0.1	0.011	B	0.007	0.27	U	0.27
Soil	J1P1W1	5/3/12	22400		3.5	4.1		0.25	4660		3.4	289		0.093	0.0071	U	0.007	0.24	U	0.24

Table C-2. 100-D-66 In-process Inorganic Sample Results - Inorganics. (5 Pages)

Sample Description	Sample Number	Sample Date	Nickel			Potassium			Selenium			Silicon			Silver			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
Soil	J1NJT0	2/23/12	10.6	X	0.12	785		40	0.84	U	0.84	267	N	5.5	0.16	U	0.16	259		57.6
Soil	J1NJT1	2/23/12	9.6	X	0.12	678		38.4	0.81	U	0.81	244		5.3	0.15	U	0.15	264		55.3
Soil	J1NJT2	2/23/12	10.5	X	0.12	1040		39.8	0.84	U	0.84	240		5.5	0.16	U	0.16	225		57.3
Soil	J1NJT3	2/23/12	11	X	0.11	1040		37.4	0.79	U	0.79	139		5.2	0.15	U	0.15	170		53.9
Soil	J1NJT4	2/23/12	10.4	X	0.12	945		39.4	0.83	U	0.83	226		5.4	0.15	U	0.15	201		56.7
Soil	J1NJT5	2/23/12	9.1	X	0.11	920		37.4	0.79	U	0.79	135		5.2	0.15	U	0.15	139		53.9
Soil	J1NJT6	2/23/12	9.5	X	0.12	856		38.5	0.81	U	0.81	215		5.3	0.15	U	0.15	186		55.4
Soil	J1NJT7	2/23/12	11.4	X	0.13	1170		42.1	0.88	U	0.88	285		5.8	0.16	U	0.16	314		60.6
Soil	J1NJT8	2/23/12	10.5	X	0.13	950		43.7	0.92	U	0.92	261		6	0.17	U	0.17	328		62.8
Soil	J1NJT9	2/23/12	9.3	X	0.11	1280		37	0.78	U	0.78	234		5.1	0.14	U	0.14	240		53.2
Soil	J1NJV0	2/23/12	11.9	X	0.12	1480		41	0.86	U	0.86	316		5.7	0.16	U	0.16	270		59
Soil	J1NJV1	2/23/12	9.4	X	0.12	1140		39.3	0.82	U	0.82	304		5.4	0.15	U	0.15	258		56.6
Soil	J1P1V2	5/3/12	13.5	X	0.12	763		38.7	0.94		0.81	244	N	5.3	0.15	U	0.15	284		55.7
Soil	J1P1V3	5/3/12	12.1	X	0.13	708		42.9	0.9	U	0.9	263	N	5.9	0.17	U	0.17	224		61.7
Soil	J1P1V4	5/3/12	11.8	X	0.11	466		37.7	0.79	U	0.79	156	N	5.2	0.15	U	0.15	220		54.3
Soil	J1P1V5	5/3/12	10.4	X	0.12	668		38.9	1.3		0.82	181	N	5.4	0.15	U	0.15	261		56
Soil	J1P1V6	5/3/12	11.9	X	0.12	1190		39.1	0.89	B	0.82	377	N	5.4	0.15	U	0.15	235		56.3
Soil	J1P1V7	5/3/12	10.2	X	0.11	1000		37.8	0.89	B	0.79	249	N	5.2	0.15	U	0.15	229		54.4
Soil	J1P1V8	5/3/12	10.9	X	0.12	944		39.2	0.82	U	0.82	264	N	5.4	0.15	U	0.15	218		56.3
Soil	J1P1V9	5/3/12	11	X	0.13	1030		42.9	0.9	U	0.9	257	N	5.9	0.17	U	0.17	332		61.7
Soil	J1P1W0	5/3/12	12.2	X	0.13	1110		42.2	0.89	U	0.89	398	N	5.8	0.16	U	0.16	320		60.7
Soil	J1P1W1	5/3/12	11.3	X	0.11	1220		38.1	0.8	U	0.8	347	N	5.3	0.15	U	0.15	310		54.9

Table C-2. 100-D-66 In-process Inorganic Sample Results - Inorganics. (5 Pages)

Table C-2. 100-D-65 In-process Inorganic Sample Results - Inorganics. (3 Pages)								
Sample Description	Sample Number	Sample Date	Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1NJT0	2/23/12	55.3	X	0.092	44	X	0.39
Soil	J1NJT1	2/23/12	51.2	X	0.088	37.6	X	0.37
Soil	J1NJT2	2/23/12	38.9	X	0.091	45.6	X	0.39
Soil	J1NJT3	2/23/12	25.4	X	0.086	30.4	X	0.36
Soil	J1NJT4	2/23/12	39.9	X	0.09	37.8	X	0.38
Soil	J1NJT5	2/23/12	24	X	0.086	29	X	0.36
Soil	J1NJT6	2/23/12	32.8	X	0.088	37.2	X	0.37
Soil	J1NJT7	2/23/12	57.2	X	0.096	47.6	X	0.41
Soil	J1NJT8	2/23/12	54.2	X	0.1	44	X	0.42
Soil	J1NJT9	2/23/12	52.7	X	0.085	44.3	X	0.36
Soil	J1NJV0	2/23/12	48.1	X	0.094	43	X	0.4
Soil	J1NJV1	2/23/12	52	X	0.09	41.9	X	0.38
Soil	J1P1V2	5/3/12	56.9		0.089	40	X	0.38
Soil	J1P1V3	5/3/12	34.7		0.098	32.2	X	0.42
Soil	J1P1V4	5/3/12	35.8		0.087	26.5	X	0.37
Soil	J1P1V5	5/3/12	87.1		0.45	51.5	X	0.38
Soil	J1P1V6	5/3/12	45.9		0.09	42.7	X	0.38
Soil	J1P1V7	5/3/12	37.6		0.087	35.8	X	0.37
Soil	J1P1V8	5/3/12	28.5		0.09	31.7	X	0.38
Soil	J1P1V9	5/3/12	49.4		0.098	41.4	X	0.42
Soil	J1P1W0	5/3/12	53.4		0.097	43.7	X	0.41
Soil	J1P1W1	5/3/12	51.6		0.087	42.6	X	0.37

Table C-3. 100-D-65 In-process Sample Results - Radionuclides. (2 pages)

Sample Description	HEIS Number	Sample Date	Americium-241 GEA			Cesium-137			Cobalt-60			Europium-152			Europium-154			Europium-155		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Soil	J1NJT0	2/23/12	-0.0059	U	0.0278	0.0177	U	0.023	-0.013	U	0.0232	0.0015	U	0.046	0.0118	U	0.072	0.031	U	0.0433
Soil	J1NJT1	2/23/12	-0.0585	U	0.203	-0.002	U	0.0235	0.011	U	0.0309	0.0112	U	0.06	-0.0015	U	0.088	0.027	U	0.0663
Soil	J1NJT2	2/23/12	0.0632	U	0.178	7.55		0.0606	0.319		0.0381	4.27		0.167	0.354	U	0.212	0.149	U	0.163
Soil	J1NJT3	2/23/12	-0.0517	U	0.0765	0.166		0.0429	0.017	U	0.0454	0.0082	U	0.108	-0.004	U	0.135	0.009	U	0.107
Soil	J1NJT4	2/23/12	0.03	U	0.194	0.928		0.0268	0.035	U	0.0338	0.93		0.069	0.0638	U	0.101	0.059	U	0.0849
Soil	J1NJT5	2/23/12	0.0046	U	0.0344	0.733		0.0273	0.008	U	0.0313	0.188	U	0.077	0.0049	U	0.097	0.043	U	0.0499
Soil	J1NJT6	2/23/12	0.0101	U	0.0339	5.23		0.0293	0.07		0.0216	0.804		0.068	0.0326	U	0.093	0.032	U	0.0553
Soil	J1NJT7	2/23/12	0.0296	U	0.0818	0.0679		0.0445	0.01	U	0.0424	0.0284	U	0.111	-0.0222	U	0.116	0.054	U	0.115
Soil	J1NJT8	2/23/12	0.0061	U	0.0419	0.0148	U	0.0286	-0.002	U	0.025	0.0059	U	0.065	0.0095	U	0.091	0.043	U	0.0625
Soil	J1NJT9	2/23/12	-0.0799	U	0.0771	0.0025	U	0.0383	0.004	U	0.0372	-0.0225	U	0.097	0.022	U	0.118	0.011	U	0.108
Soil	J1NJV0	2/23/12	0.0138	U	0.045	0.0011	U	0.0277	0.004	U	0.0285	0.0571	U	0.069	0.0351	U	0.091	0.04	U	0.0659
Soil	J1NJV1	2/23/12	-0.0037	U	0.028	0.0146	U	0.0257	0.003	U	0.0269	0.0069	U	0.05	-0.0232	U	0.074	0.047	U	0.0444
Soil	J1P1V2	5/3/12	0.0011	U	0.0275	0.0381		0.0229	-0.007	U	0.024	0.0276	U	0.053	0.0292	U	0.081	3E-04	U	0.0437
Soil	J1P1V3	5/3/12	0.0216	U	0.0494	0.475		0.0289	0.026	U	0.0357	0.404	U	0.11	-0.0007	U	0.097	0.062	U	0.0733
Soil	J1P1V4	5/3/12	-0.0173	U	0.0679	0.0477	U	0.0476	0.003	U	0.0397	0.0532	U	0.101	-0.0112	U	0.112	0.063	U	0.0951
Soil	J1P1V5	5/3/12	-0.0012	U	0.151	0.167		0.0306	-0.013	U	0.0259	-0.0482	U	0.096	0.006	U	0.106	-0.048	U	0.107
Soil	J1P1V6	5/3/12	-0.0037	U	0.035	0.118		0.0271	-0.001	U	0.0255	0.0612	U	0.065	0.0136	U	0.092	0.046	U	0.0481
Soil	J1P1V7	5/3/12	0.145	U	0.293	0.87		0.0301	0.009	U	0.0326	0.305		0.077	0.0518	U	0.104	0.016	U	0.0888
Soil	J1P1V8	5/3/12	-0.0013	U	0.0369	1.68		0.03	0.016	U	0.0328	0.173		0.064	0.022	U	0.099	0.072	U	0.0597
Soil	J1P1V9	5/3/12	-0.0051	U	0.044	-0.003	U	0.0285	-0.009	U	0.0269	-0.0287	U	0.065	0.0556	U	0.093	0.03	U	0.0667
Soil	J1P1W0	5/3/12	0.031	U	0.0768	0.0062	U	0.0449	0.014	U	0.0451	-0.017	U	0.112	0.008	U	0.131	0.016	U	0.112
Soil	J1P1W1	5/3/12	-0.0008	U	0.147	0.0058	U	0.0312	-0.004	U	0.0286	0.0247	U	0.08	-0.0067	U	0.096	-0.038	U	0.104

Table C-3. 100-D-65 In-process Sample Results - Radionuclides. (2 pages)

Sample Description	HEIS Number	Sample Date	Silver-108 m			Carbon-14			Tritium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Soil	J1NJT0	2/23/12	0.0059	U	0.0154	0.0863	U	0.455	Not analzyed		
Soil	J1NJT1	2/23/12	-0.0067	U	0.0165	0.121	U	0.457			
Soil	J1NJT2	2/23/12	0.0054	U	0.0563	0.232	U	0.456			
Soil	J1NJT3	2/23/12	-0.0119	U	0.0325	0.232	U	0.455			
Soil	J1NJT4	2/23/12	-0.0091	U	0.0197	0.183	U	0.455			
Soil	J1NJT5	2/23/12	-0.0025	U	0.0194	0.0476	U	0.456			
Soil	J1NJT6	2/23/12	0.0104	U	0.0262	0.169	U	0.456			
Soil	J1NJT7	2/23/12	0.0025	U	0.0335	0.325	U	0.456			
Soil	J1NJT8	2/23/12	0.0002	U	0.0195	0.271	U	0.456			
Soil	J1NJT9	2/23/12	-0.0024	U	0.0284	0.0715	U	0.455			
Soil	J1NJV0	2/23/12	0.0031	U	0.0207	-0.001	U	0.455			
Soil	J1NJV1	2/23/12	0.0045	U	0.0163	0.403	U	0.457			
Soil	J1P1V2	5/3/12	-0.005	U	0.0153	0.287	U	0.314	0.002	U	0.0314
Soil	J1P1V3	5/3/12	0.0041	U	0.0228	0.101	U	0.312	0.004	U	0.0317
Soil	J1P1V4	5/3/12	-0.0038	U	0.0305	-0.074	U	0.313	0.009	U	0.0277
Soil	J1P1V5	5/3/12	-0.0052	U	0.0281	0.0967	U	0.314	0.016	U	0.0346
Soil	J1P1V6	5/3/12	0.0001	U	0.0181	0.012	U	0.312	0.01	U	0.0366
Soil	J1P1V7	5/3/12	0.0072	U	0.0241	-0.052	U	0.312	0.005	U	0.0296
Soil	J1P1V8	5/3/12	0.0058	U	0.022	-0.097	U	0.313	0.005	U	0.0336
Soil	J1P1V9	5/3/12	0.0018	U	0.0204	-0.078	U	0.313	0.048		0.0281
Soil	J1P1W0	5/3/12	0.0043	U	0.0357	0.0341	U	0.313	0.007	U	0.0324
Soil	J1P1W1	5/3/12	-0.0051	U	0.025	0.082	U	0.312	-9E-05	U	0.0291

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT0			J1NJT1			J1NJT2			J1NJT3		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	10	U	10	11	U	11	10	U	10
Acenaphthylene	9	U	9	9.1	U	9.1	9.5	U	9.5	9.4	U	9.4
Anthracene	3.1	U	3.1	3.1	U	3.1	3.2	U	3.2	3.2	U	3.2
Benzo(a)anthracene	3.2	U	3.2	3.2	U	3.2	3.4	U	3.4	3.3	U	3.3
Benzo(a)pyrene	6.4	U	6.4	6.5	U	6.5	6.8	U	6.8	6.7	U	6.7
Benzo(b)fluoranthene	4.2	U	4.2	4.2	U	4.2	4.4	U	4.4	4.4	U	4.4
Benzo(ghi)perylene	7.2	U	7.2	7.3	U	7.3	7.6	U	7.6	7.5	U	7.5
Benzo(k)fluoranthene	3.9	U	3.9	4	U	4	4.2	U	4.2	4.1	U	4.1
Chrysene	4.8	U	4.8	4.9	U	4.9	5.1	U	5.1	5	U	5
Dibenz[a,h]anthracene	11	U	11	11	U	11	12	U	12	11	U	11
Fluoranthene	13	U	13	13	U	13	14	U	14	14	U	14
Fluorene	5.3	U	5.3	5.3	U	5.3	5.6	U	5.6	5.5	U	5.5
Indeno(1,2,3-cd)pyrene	12	U	12	12	U	12	13	U	13	12	U	12
Naphthalene	12	U	12	12	U	12	13	U	13	12	U	12
Phenanthrene	12	U	12	12	U	12	13	U	13	12	U	12
Pyrene	12	U	12	12	U	12	13	U	13	12	U	12
Pesticides												
Aldrin	0.26	U	0.26	0.25	U	0.25	0.26	U	0.26	0.26	U	0.26
Alpha-BHC	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
alpha-Chlordane	0.33	U	0.33	0.33	U	0.33	0.33	U	0.33	0.33	U	0.33
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.68	U	0.68	0.67	U	0.67	0.69	U	0.69	0.68	U	0.68
Delta-BHC	0.41	U	0.41	0.41	U	0.41	0.41	U	0.41	0.41	U	0.41
Dichlorodiphenyldichloroethane	0.56	U	0.56	0.55	U	0.55	0.56	U	0.56	0.56	U	0.56
Dichlorodiphenyldichloroethylene	0.24	U	0.24	0.24	U	0.24	0.25	U	0.25	0.25	U	0.25
Dichlorodiphenyltrichloroethane	0.61	U	0.61	0.6	U	0.6	0.61	U	0.61	0.61	U	0.61
Dieldrin	0.22	U	0.22	0.21	U	0.21	0.22	U	0.22	0.22	U	0.22
Endosulfan I	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18
Endosulfan II	0.3	U	0.3	0.29	U	0.29	0.3	U	0.3	0.3	U	0.3
Endosulfan sulfate	0.28	U	0.28	0.28	U	0.28	0.29	U	0.29	0.28	U	0.28
Endrin	0.31	U	0.31	0.31	U	0.31	0.32	U	0.32	0.32	U	0.32
Endrin aldehyde	0.18	U	0.18	0.17	U	0.17	0.18	U	0.18	0.18	U	0.18
Endrin ketone	0.5	U	0.5	0.49	U	0.49	0.51	U	0.51	0.5	U	0.5
Gamma-BHC (Lindane)	0.48	U	0.48	0.47	U	0.47	0.48	U	0.48	0.48	U	0.48
gamma-Chlordane	0.27	U	0.27	0.27	U	0.27	0.28	U	0.28	0.27	U	0.27
Heptachlor	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
Heptachlor epoxide	0.44	U	0.44	0.43	U	0.43	0.44	U	0.44	0.44	U	0.44
Methoxychlor	0.46	U	0.46	0.45	U	0.45	0.47	U	0.47	0.46	U	0.46
Toxaphene	16	U	16	16	U	16	16	U	16	16	U	16

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT0			J1NJT1			J1NJT2			J1NJT3		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	29	U	29	29	U	29	29	U	29	29	U	29
1,2-Dichlorobenzene	23	U	23	23	U	23	23	U	23	23	U	23
1,3-Dichlorobenzene	12	U	12	12	U	12	13	U	13	12	U	12
1,4-Dichlorobenzene	14	U	14	14	U	14	14	U	14	14	U	14
2,4,5-Trichlorophenol	10	U	10	10	U	10	10	U	10	10	U	10
2,4,6-Trichlorophenol	10	U	10	10	U	10	10	U	10	10	U	10
2,4-Dichlorophenol	10	U	10	10	U	10	10	U	10	10	U	10
2,4-Dimethylphenol	68	U	68	68	U	68	69	U	69	68	U	68
2,4-Dinitrophenol	340	U	340	340	U	340	350	U	350	340	U	340
2,4-Dinitrotoluene	68	U	68	68	U	68	69	U	69	68	U	68
2,6-Dinitrotoluene	29	U	29	29	U	29	29	U	29	29	U	29
2-Chloronaphthalene	10	U	10	10	U	10	10	U	10	10	U	10
2-Chlorophenol	22	U	22	22	U	22	22	U	22	22	U	22
2-Methylnaphthalene	20	U	20	19	U	19	20	U	20	20	U	20
2-Methylphenol (cresol, o-)	13	U	13	13	U	13	14	U	14	13	U	13
2-Nitroaniline	51	U	51	51	U	51	52	U	52	51	U	51
2-Nitrophenol	10	U	10	10	U	10	10	U	10	10	U	10
3+4 Methylphenol (cresol, m+p)	34	U	34	34	U	34	34	U	34	34	U	34
3,3'-Dichlorobenzidine	93	U	93	92	U	92	94	U	94	92	U	92
3-Nitroaniline	75	U	75	75	U	75	76	U	76	75	U	75
4,6-Dinitro-2-methylphenol	340	U	340	340	U	340	340	U	340	340	U	340
4-Bromophenylphenyl ether	20	U	20	19	U	19	20	U	20	20	U	20
4-Chloro-3-methylphenol	68	U	68	68	U	68	69	U	69	68	U	68
4-Chloroaniline	84	U	84	84	U	84	86	U	86	84	U	84
4-Chlorophenylphenyl ether	22	U	22	22	U	22	22	U	22	22	U	22
4-Nitroaniline	75	U	75	74	U	74	76	U	76	74	U	74
4-Nitrophenol	100	U	100	99	U	99	100	U	100	100	U	100
Acenaphthene	11	U	11	11	U	11	11	U	11	11	U	11
Acenaphthylene	17	U	17	17	U	17	18	U	18	17	U	17
Anthracene	17	U	17	17	U	17	18	U	18	17	U	17
Benzo(a)anthracene	21	U	21	20	U	20	21	U	21	21	U	21
Benzo(a)pyrene	21	U	21	20	U	20	21	U	21	21	U	21
Benzo(b)fluoranthene	27	U	27	27	U	27	27	U	27	27	U	27
Benzo(ghi)perylene	16	U	16	16	U	16	17	U	17	16	U	16
Benzo(k)fluoranthene	41	U	41	41	U	41	42	U	42	41	U	41
Bis(2-chloro-1-methylethyl)ether	24	U	24	24	U	24	24	U	24	24	U	24
Bis(2-Chloroethoxy)methane	24	U	24	24	U	24	24	U	24	24	U	24
Bis(2-chloroethyl) ether	17	U	17	17	U	17	17	U	17	17	U	17
Bis(2-ethylhexyl) phthalate	47	U	47	47	U	47	48	U	48	47	U	47
Butylbenzylphthalate	44	U	44	44	U	44	45	U	45	44	U	44
Carbazole	37	U	37	37	U	37	38	U	38	37	U	37
Chrysene	28	U	28	28	U	28	28	U	28	28	U	28
Di-n-butylphthalate	30	U	30	30	U	30	30	U	30	30	U	30
Di-n-octylphthalate	15	U	15	15	U	15	15	U	15	15	U	15
Dibenz[a,h]anthracene	20	U	20	19	U	19	20	U	20	20	U	20
Dibenzofuran	21	U	21	20	U	20	21	U	21	21	U	21

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT0			J1NJT1			J1NJT2			J1NJT3		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Diethyl phthalate	27	U	27	27	U	27	27	U	27	27	U	27
Dimethyl phthalate	24	U	24	24	U	24	24	U	24	24	U	24
Fluoranthene	37	U	37	37	U	37	38	U	38	37	U	37
Fluorene	19	U	19	18	U	18	19	U	19	18	U	18
Hexachlorobenzene	30	U	30	30	U	30	30	U	30	30	U	30
Hexachlorobutadiene	10	U	10	10	U	10	10	U	10	10	U	10
Hexachlorocyclopentadiene	51	U	51	51	U	51	52	U	52	51	U	51
Hexachloroethane	22	U	22	22	U	22	22	U	22	22	U	22
Indeno(1,2,3-cd)pyrene	23	U	23	23	U	23	23	U	23	23	U	23
Isophorone	17	U	17	17	U	17	18	U	18	17	U	17
N-Nitroso-di-n-dipropylamine	32	U	32	32	U	32	32	U	32	32	U	32
N-Nitrosodiphenylamine	22	U	22	22	U	22	22	U	22	22	U	22
Naphthalene	32	U	32	32	U	32	32	U	32	32	U	32
Nitrobenzene	23	U	23	23	U	23	23	U	23	23	U	23
Pentachlorophenol	340	U	340	340	U	340	340	U	340	340	U	340
Phenanthrene	17	U	17	17	U	17	18	U	18	17	U	17
Phenol	19	U	19	18	U	18	19	U	19	18	U	18
Pyrene	12	U	12	12	U	12	13	U	13	12	U	12

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT4			J1NJT5			J1NJT6			J1NJT7		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	10	U	10	10	U	10	11	U	11
Acenaphthylene	9.4	U	9.4	9.2	U	9.2	9.3	U	9.3	9.5	U	9.5
Anthracene	3.2	U	3.2	3.1	U	3.1	3.2	U	3.2	3.2	U	3.2
Benzo(a)anthracene	3.3	U	3.3	3.3	U	3.3	3.3	U	3.3	3.4	U	3.4
Benzo(a)pyrene	6.7	U	6.7	6.6	U	6.6	6.6	U	6.6	6.7	U	6.7
Benzo(b)fluoranthene	4.4	U	4.4	4.3	U	4.3	4.3	U	4.3	4.4	U	4.4
Benzo(ghi)perylene	7.5	U	7.5	7.4	U	7.4	7.5	U	7.5	7.6	U	7.6
Benzo(k)fluoranthene	4.1	U	4.1	4	U	4	4.1	U	4.1	4.1	U	4.1
Chrysene	5.1	U	5.1	5	U	5	5	U	5	5.1	U	5.1
Dibenz[a,h]anthracene	12	U	12	11	U	11	11	U	11	12	U	12
Fluoranthene	14	U	14	13	U	13	13	U	13	14	U	14
Fluorene	5.5	U	5.5	5.4	U	5.4	5.5	U	5.5	5.5	U	5.5
Indeno(1,2,3-cd)pyrene	13	U	13	12	U	12	12	U	12	13	U	13
Naphthalene	13	U	13	12	U	12	12	U	12	13	U	13
Phenanthrene	13	U	13	12	U	12	12	U	12	13	U	13
Pyrene	13	U	13	12	U	12	12	U	12	13	U	13
Pesticides												
Aldrin	0.26	U	0.26	0.25	U	0.25	0.25	U	0.25	0.27	U	0.27
Alpha-BHC	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22	0.23	U	0.23
alpha-Chlordane	0.34	U	0.34	0.33	U	0.33	0.33	U	0.33	0.34	U	0.34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.69	U	0.69	0.67	U	0.67	0.67	U	0.67	0.7	U	0.7
Delta-BHC	0.42	U	0.42	0.4	U	0.4	0.4	U	0.4	0.42	U	0.42
Dichlorodiphenyldichloroethane	0.57	U	0.57	0.55	U	0.55	0.55	U	0.55	0.58	U	0.58
Dichlorodiphenyldichloroethylene	0.25	U	0.25	0.24	U	0.24	0.24	U	0.24	0.65	J	0.25
Dichlorodiphenyltrichloroethane	0.62	U	0.62	0.6	U	0.6	0.6	U	0.6	0.62	U	0.62
Dieldrin	0.22	U	0.22	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22
Endosulfan I	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18	0.19	U	0.19
Endosulfan II	0.3	U	0.3	0.29	U	0.29	0.29	U	0.29	0.3	U	0.3
Endosulfan sulfate	0.29	U	0.29	0.28	U	0.28	0.28	U	0.28	0.29	U	0.29
Endrin	0.32	U	0.32	0.31	U	0.31	0.31	U	0.31	0.32	U	0.32
Endrin aldehyde	0.18	U	0.18	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18
Endrin ketone	0.51	U	0.51	0.49	U	0.49	0.49	U	0.49	0.52	U	0.52
Gamma-BHC (Lindane)	0.48	U	0.48	0.47	U	0.47	0.47	U	0.47	0.49	U	0.49
gamma-Chlordane	0.28	U	0.28	0.27	U	0.27	0.27	U	0.27	0.28	U	0.28
Heptachlor	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22	0.23	U	0.23
Heptachlor epoxide	0.44	U	0.44	0.43	U	0.43	0.43	U	0.43	0.45	U	0.45
Methoxychlor	0.47	U	0.47	0.45	U	0.45	0.45	U	0.45	0.48	U	0.48
Toxaphene	16	U	16	16	U	16	16	U	16	17	U	17

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT4			J1NJT5			J1NJT6			J1NJT7		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	29	U	29	27	U	27	29	U	29	28	U	28
1,2-Dichlorobenzene	23	U	23	21	U	21	22	U	22	22	U	22
1,3-Dichlorobenzene	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	14	U	14	13	U	13	14	U	14	14	U	14
2,4,5-Trichlorophenol	10	U	10	9.8	U	9.8	10	U	10	10	U	10
2,4,6-Trichlorophenol	10	U	10	9.8	U	9.8	10	U	10	10	U	10
2,4-Dichlorophenol	10	U	10	9.8	U	9.8	10	U	10	10	U	10
2,4-Dimethylphenol	69	U	69	64	U	64	67	U	67	67	U	67
2,4-Dinitrophenol	350	U	350	330	U	330	340	U	340	340	U	340
2,4-Dinitrotoluene	69	U	69	64	U	64	67	U	67	67	U	67
2,6-Dinitrotoluene	29	U	29	27	U	27	29	U	29	28	U	28
2-Chloronaphthalene	10	U	10	9.8	U	9.8	10	U	10	10	U	10
2-Chlorophenol	22	U	22	21	U	21	21	U	21	21	U	21
2-Methylnaphthalene	20	U	20	19	U	19	19	U	19	19	U	19
2-Methylphenol (cresol, o-)	14	U	14	13	U	13	13	U	13	13	U	13
2-Nitroaniline	52	U	52	49	U	49	51	U	51	51	U	51
2-Nitrophenol	10	U	10	9.8	U	9.8	10	U	10	10	U	10
3+4 Methylphenol (cresol, m+p)	34	U	34	32	U	32	34	U	34	33	U	33
3,3'-Dichlorobenzidine	94	U	94	88	U	88	92	U	92	91	U	91
3-Nitroaniline	76	U	76	71	U	71	75	U	75	74	U	74
4,6-Dinitro-2-methylphenol	340	U	340	320	U	320	340	U	340	330	U	330
4-Bromophenylphenyl ether	20	U	20	19	U	19	19	U	19	19	U	19
4-Chloro-3-methylphenol	69	U	69	64	U	64	67	U	67	67	U	67
4-Chloroaniline	85	U	85	80	U	80	84	U	84	83	U	83
4-Chlorophenylphenyl ether	22	U	22	21	U	21	21	U	21	21	U	21
4-Nitroaniline	75	U	75	71	U	71	74	U	74	73	U	73
4-Nitrophenol	100	U	100	95	U	95	99	U	99	98	U	98
Acenaphthene	11	U	11	10	U	10	11	U	11	10	U	10
Acenaphthylene	18	U	18	17	U	17	17	U	17	17	U	17
Anthracene	18	U	18	17	U	17	17	U	17	17	U	17
Benzo(a)anthracene	21	U	21	20	U	20	20	U	20	20	U	20
Benzo(a)pyrene	21	U	21	20	U	20	20	U	20	20	U	20
Benzo(b)fluoranthene	27	U	27	26	U	26	27	U	27	27	U	27
Benzo(ghi)perylene	17	U	17	16	U	16	16	U	16	16	U	16
Benzo(k)fluoranthene	42	U	42	39	U	39	41	U	41	41	U	41
Bis(2-chloro-1-methylethyl)ether	24	U	24	22	U	22	24	U	24	23	U	23
Bis(2-Chloroethoxy)methane	24	U	24	22	U	22	24	U	24	23	U	23
Bis(2-chloroethyl) ether	17	U	17	16	U	16	17	U	17	17	U	17
Bis(2-ethylhexyl) phthalate	48	U	48	45	U	45	47	U	47	47	U	47
Butylbenzylphthalate	45	U	45	42	U	42	44	U	44	44	U	44
Carbazole	37	U	37	35	U	35	37	U	37	36	U	36
Chrysene	28	U	28	26	U	26	28	U	28	27	U	27
Di-n-butylphthalate	30	U	30	28	U	28	30	U	30	29	U	29
Di-n-octylphthalate	15	U	15	14	U	14	15	U	15	15	U	15
Dibenz[a,h]anthracene	20	U	20	19	U	19	19	U	19	19	U	19
Dibenzofuran	21	U	21	20	U	20	20	U	20	20	U	20
Diethyl phthalate	27	U	27	25	U	25	27	U	27	26	U	26
Dimethyl phthalate	24	U	24	22	U	22	24	U	24	23	U	23
Fluoranthene	37	U	37	35	U	35	37	U	37	36	U	36

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT4			J1NJT5			J1NJT6			J1NJT7		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Fluorene	19	U	19	18	U	18	18	U	18	18	U	18
Hexachlorobenzene	30	U	30	28	U	28	30	U	30	29	U	29
Hexachlorobutadiene	10	U	10	9.8	U	9.8	10	U	10	10	U	10
Hexachlorocyclopentadiene	52	U	52	49	U	49	51	U	51	51	U	51
Hexachloroethane	22	U	22	21	U	21	22	U	22	22	U	22
Indeno(1,2,3-cd)pyrene	23	U	23	21	U	21	22	U	22	22	U	22
Isophorone	18	U	18	17	U	17	17	U	17	17	U	17
N-Nitroso-di-n-dipropylamine	32	U	32	30	U	30	32	U	32	31	U	31
N-Nitrosodiphenylamine	22	U	22	21	U	21	21	U	21	21	U	21
Naphthalene	32	U	32	30	U	30	32	U	32	31	U	31
Nitrobenzene	23	U	23	21	U	21	22	U	22	22	U	22
Pentachlorophenol	340	U	340	320	U	320	340	U	340	330	U	330
Phenanthrene	18	U	18	17	U	17	17	U	17	17	U	17
Phenol	19	U	19	18	U	18	18	U	18	18	U	18
Pyrene	13	U	13	12	U	12	12	U	12	12	U	12

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT8			J1NJT9			J1NJV0			J1NJV1		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	11	U	11	10	U	10	10	U	10	10	U	10
Acenaphthylene	9.6	U	9.6	9.4	U	9.4	9.4	U	9.4	9.3	U	9.3
Anthracene	3.2	U	3.2	3.2	U	3.2	3.2	U	3.2	3.1	U	3.1
Benzo(a)anthracene	450	X	3.4	3.3	U	3.3	8	JX	3.3	3.3	U	3.3
Benzo(a)pyrene	210		6.8	6.7	U	6.7	6.8	J	6.7	6.6	U	6.6
Benzo(b)fluoranthene	150		4.5	4.4	U	4.4	14	J	4.4	4.3	U	4.3
Benzo(ghi)perylene	47		7.6	7.5	U	7.5	7.5	U	7.5	7.4	U	7.4
Benzo(k)fluoranthene	110		4.2	4.1	U	4.1	5.7	J	4.1	4.1	U	4.1
Chrysene	420		5.1	5	U	5	13	J	5.1	5	U	5
Dibenz[a,h]anthracene	12	U	12	11	U	11	11	U	11	11	U	11
Fluoranthene	530		14	14	U	14	18	J	14	13	U	13
Fluorene	5.6	UX	5.6	5.5	U	5.5	5.5	U	5.5	5.5	U	5.5
Indeno(1,2,3-cd)pyrene	89		13	12	U	12	13	U	13	12	U	12
Naphthalene	13	U	13	12	U	12	13	U	13	12	U	12
Phenanthrene	23	JX	13	12	U	12	13	U	13	12	U	12
Pyrene	770		13	12	U	12	16	JX	13	12	U	12
Pesticides												
Aldrin	0.27	U	0.27	0.26	U	0.26	0.26	U	0.26	0.26	U	0.26
Alpha-BHC	0.23	U	0.23	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
alpha-Chlordane	0.34	U	0.34	0.34	U	0.34	0.34	U	0.34	0.33	U	0.33
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.71	U	0.71	0.7	U	0.7	0.7	U	0.7	0.69	U	0.69
Delta-BHC	0.43	U	0.43	0.42	U	0.42	0.42	U	0.42	0.41	U	0.41
Dichlorodiphenyldichloroethane	0.58	U	0.58	0.57	U	0.57	0.57	U	0.57	0.56	U	0.56
Dichlorodiphenyldichloroethylene	0.25	U	0.25	0.25	U	0.25	0.25	U	0.25	0.39	J	0.25
Dichlorodiphenyltrichloroethane	0.63	U	0.63	0.62	U	0.62	0.62	U	0.62	0.61	U	0.61
Dieldrin	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
Endosulfan I	0.19	U	0.19	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18
Endosulfan II	0.31	U	0.31	0.3	U	0.3	0.3	U	0.3	0.3	U	0.3
Endosulfan sulfate	0.29	U	0.29	0.29	U	0.29	0.29	U	0.29	0.28	U	0.28
Endrin	0.33	U	0.33	0.32	U	0.32	0.32	U	0.32	0.32	U	0.32
Endrin aldehyde	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18
Endrin ketone	0.52	U	0.52	0.51	U	0.51	0.51	U	0.51	0.5	U	0.5
Gamma-BHC (Lindane)	0.49	U	0.49	0.49	U	0.49	0.49	U	0.49	0.48	U	0.48
gamma-Chlordane	0.28	U	0.28	0.28	U	0.28	0.28	U	0.28	0.27	U	0.27
Heptachlor	0.23	U	0.23	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
Heptachlor epoxide	0.45	U	0.45	0.45	U	0.45	0.45	U	0.45	0.44	U	0.44
Methoxychlor	0.48	U	0.48	0.47	U	0.47	0.47	U	0.47	0.46	U	0.46
Toxaphene	17	U	17	17	U	17	17	U	17	16	U	16

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT8			J1NJT9			J1NJV0			J1NJV1		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	30	U	30	29	U	29	30	U	30	28	U	28
1,2-Dichlorobenzene	24	U	24	23	U	23	23	U	23	22	U	22
1,3-Dichlorobenzene	13	U	13	12	U	12	13	U	13	12	U	12
1,4-Dichlorobenzene	15	U	15	14	U	14	14	U	14	14	U	14
2,4,5-Trichlorophenol	11	U	11	10	U	10	11	U	11	10	U	10
2,4,6-Trichlorophenol	11	U	11	10	U	10	11	U	11	10	U	10
2,4-Dichlorophenol	11	U	11	10	U	10	11	U	11	10	U	10
2,4-Dimethylphenol	71	U	71	68	U	68	70	U	70	66	U	66
2,4-Dinitrophenol	360	U	360	340	U	340	350	U	350	330	U	330
2,4-Dinitrotoluene	71	U	71	68	U	68	70	U	70	66	U	66
2,6-Dinitrotoluene	30	U	30	29	U	29	30	U	30	28	U	28
2-Chloronaphthalene	11	U	11	10	U	10	11	U	11	10	U	10
2-Chlorophenol	22	U	22	22	U	22	22	U	22	21	U	21
2-Methylnaphthalene	20	U	20	20	U	20	20	U	20	19	U	19
2-Methylphenol (cresol, o-)	14	U	14	13	U	13	14	U	14	13	U	13
2-Nitroaniline	53	U	53	52	U	52	53	U	53	50	U	50
2-Nitrophenol	11	U	11	10	U	10	11	U	11	10	U	10
3+4 Methylphenol (cresol, m+p)	35	U	35	34	U	34	35	U	35	33	U	33
3,3'-Dichlorobenzidine	96	U	96	93	U	93	95	U	95	91	U	91
3-Nitroaniline	78	U	78	75	U	75	77	U	77	73	U	73
4,6-Dinitro-2-methylphenol	350	U	350	340	U	340	350	U	350	330	U	330
4-Bromophenylphenyl ether	20	U	20	20	U	20	20	U	20	19	U	19
4-Chloro-3-methylphenol	71	U	71	68	U	68	70	U	70	66	U	66
4-Chloroaniline	87	U	87	85	U	85	86	U	86	82	U	82
4-Chlorophenylphenyl ether	22	U	22	22	U	22	22	U	22	21	U	21
4-Nitroaniline	77	U	77	75	U	75	76	U	76	73	U	73
4-Nitrophenol	100	U	100	100	U	100	100	U	100	98	U	98
Acenaphthene	11	U	11	11	U	11	11	U	11	10	U	10
Acenaphthylene	18	U	18	18	U	18	18	U	18	17	U	17
Anthracene	37	J	18	18	U	18	18	U	18	17	U	17
Benzo(a)anthracene	190	J	21	21	U	21	21	U	21	20	U	20
Benzo(a)pyrene	86	J	21	21	U	21	21	U	21	20	U	20
Benzo(b)fluoranthene	150	JX	28	27	U	27	28	U	28	26	U	26
Benzo(ghi)perylene	30	J	17	17	U	17	17	U	17	16	U	16
Benzo(k)fluoranthene	43	UX	43	41	U	41	42	U	42	40	U	40
Bis(2-chloro-1-methylethyl)ether	25	U	25	24	U	24	24	U	24	23	U	23
Bis(2-Chloroethoxy)methane	25	U	25	24	U	24	24	U	24	23	U	23
Bis(2-chloroethyl) ether	18	U	18	17	U	17	17	U	17	17	U	17
Bis(2-ethylhexyl) phthalate	49	U	49	48	U	48	48	U	48	46	U	46
Butylbenzylphthalate	46	U	46	44	U	44	45	U	45	43	U	43
Carbazole	38	U	38	37	U	37	38	U	38	36	U	36
Chrysene	220	J	29	28	U	28	28	U	28	27	U	27
Di-n-butylphthalate	31	U	31	30	U	30	31	U	31	29	U	29
Di-n-octylphthalate	15	U	15	15	U	15	15	U	15	14	U	14
Dibenz[a,h]anthracene	20	U	20	20	U	20	20	U	20	19	U	19
Dibenzofuran	21	U	21	21	U	21	21	U	21	20	U	20
Diethyl phthalate	28	U	28	27	U	27	27	U	27	26	U	26
Dimethyl phthalate	25	U	25	24	U	24	24	U	24	23	U	23
Fluoranthene	370		38	37	U	37	38	U	38	36	U	36
Fluorene	19	U	19	19	U	19	19	U	19	18	U	18

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1NJT8			J1NJT9			J1NJV0			J1NJV1		
	2/23/2012			2/23/2012			2/23/2012			2/23/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Hexachlorobenzene	31	U	31	30	U	30	31	U	31	29	U	29
Hexachlorobutadiene	11	U	11	10	U	10	11	U	11	10	U	10
Hexachlorocyclopentadiene	53	U	53	52	U	52	53	U	53	50	U	50
Hexachloroethane	23	U	23	22	U	22	22	U	22	21	U	21
Indeno(1,2,3-cd)pyrene	35	J	24	23	U	23	23	U	23	22	U	22
Isophorone	18	U	18	18	U	18	18	U	18	17	U	17
N-Nitroso-di-n-dipropylamine	33	U	33	32	U	32	33	U	33	31	U	31
N-Nitrosodiphenylamine	22	U	22	22	U	22	22	U	22	21	U	21
Naphthalene	33	U	33	32	U	32	33	U	33	31	U	31
Nitrobenzene	24	U	24	23	U	23	23	U	23	22	U	22
Pentachlorophenol	350	U	350	340	U	340	350	U	350	330	U	330
Phenanthrene	110	J	18	18	U	18	18	U	18	17	U	17
Phenol	19	U	19	19	U	19	19	U	19	18	U	18
Pyrene	400		13	13	U	13	13	U	13	18	J	12

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V2			J1P1V3			J1P1V4			J1P1V5		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	10	U	10	9.9	U	9.9	10	U	10
Acenaphthylene	9.1	U	9.1	9	U	9	9	U	9	9.1	U	9.1
Anthracene	3.1	U	3.1	3	U	3	3	U	3	3.1	U	3.1
Benzo(a)anthracene	3.2	U	3.2	3.2	U	3.2	3.2	U	3.2	3.2	U	3.2
Benzo(a)pyrene	6.5	U	6.5	6.4	U	6.4	6.4	U	6.4	6.5	U	6.5
Benzo(b)fluoranthene	4.2	U	4.2	4.2	U	4.2	4.2	U	4.2	4.3	U	4.3
Benzo(ghi)perylene	7.3	U	7.3	7.2	U	7.2	7.2	U	7.2	7.3	U	7.3
Benzo(k)fluoranthene	4	U	4	3.9	U	3.9	3.9	U	3.9	4	U	4
Chrysene	4.9	U	4.9	4.8	U	4.8	4.8	U	4.8	4.9	U	4.9
Dibenz[a,h]anthracene	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	13	U	13	13	U	13	13	U	13	13	U	13
Fluorene	5.3	U	5.3	5.3	U	5.3	5.3	U	5.3	5.4	U	5.4
Indeno(1,2,3-cd)pyrene	12	U	12	12	U	12	12	U	12	12	U	12
Naphthalene	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	12	U	12	12	U	12	12	U	12	12	U	12
Pyrene	12	U	12	12	U	12	12	U	12	12	U	12
Pesticides												
Aldrin	0.25	U	0.25	0.25	U	0.25	0.25	U	0.25	0.26	U	0.26
Alpha-BHC	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.23	U	0.23
alpha-Chlordane	0.32	U	0.32	0.32	U	0.32	0.33	U	0.33	0.34	U	0.34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.66	U	0.66	0.65	U	0.65	0.67	U	0.67	0.7	U	0.7
Delta-BHC	0.4	U	0.4	0.39	U	0.39	0.41	U	0.41	0.42	U	0.42
Dichlorodiphenyldichloroethane	0.54	U	0.54	0.53	U	0.53	0.55	U	0.55	0.58	U	0.58
Dichlorodiphenyldichloroethylene	0.24	U	0.24	0.23	U	0.23	0.24	U	0.24	0.25	U	0.25
Dichlorodiphenyltrichloroethane	0.58	U	0.58	0.58	U	0.58	0.6	U	0.6	0.62	U	0.62
Dieldrin	0.21	U	0.21	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22
Endosulfan I	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18	0.19	U	0.19
Endosulfan II	0.28	U	0.28	0.28	U	0.28	0.29	U	0.29	0.3	U	0.3
Endosulfan sulfate	0.27	U	0.27	0.27	U	0.27	0.28	U	0.28	0.29	U	0.29
Endrin	0.3	U	0.3	0.3	U	0.3	0.31	U	0.31	0.32	U	0.32
Endrin aldehyde	0.17	U	0.17	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18
Endrin ketone	0.48	U	0.48	0.48	U	0.48	0.5	U	0.5	0.52	U	0.52
Gamma-BHC (Lindane)	0.46	U	0.46	0.45	U	0.45	0.47	U	0.47	0.49	U	0.49
gamma-Chlordane	0.26	U	0.26	0.26	U	0.26	0.27	U	0.27	0.28	U	0.28
Heptachlor	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.23	U	0.23
Heptachlor epoxide	0.42	U	0.42	0.42	U	0.42	0.43	U	0.43	0.45	U	0.45
Methoxychlor	0.45	U	0.45	0.44	U	0.44	0.46	U	0.46	0.47	U	0.47
Toxaphene	16	U	16	15	U	15	16	U	16	17	U	17

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V2			J1P1V3			J1P1V4			J1P1V5		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	28	U	28	27	U	27	28	U	28	29	U	29
1,2-Dichlorobenzene	22	U	22	22	U	22	22	U	22	23	U	23
1,3-Dichlorobenzene	12	U	12	12	U	12	12	U	12	13	U	13
1,4-Dichlorobenzene	14	U	14	13	U	13	14	U	14	14	U	14
2,4,5-Trichlorophenol	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
2,4,6-Trichlorophenol	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
2,4-Dichlorophenol	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
2,4-Dimethylphenol	67	U	67	65	U	65	66	U	66	69	U	69
2,4-Dinitrophenol	340	U	340	330	U	330	330	U	330	350	U	350
2,4-Dinitrotoluene	67	U	67	65	U	65	66	U	66	69	U	69
2,6-Dinitrotoluene	28	U	28	27	U	27	28	U	28	29	U	29
2-Chloronaphthalene	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
2-Chlorophenol	21	U	21	21	U	21	21	U	21	22	U	22
2-Methylnaphthalene	19	U	19	19	U	19	19	U	19	20	U	20
2-Methylphenol (cresol, o-)	13	U	13	13	U	13	13	U	13	14	U	14
2-Nitroaniline	51	U	51	49	U	49	50	U	50	52	U	52
2-Nitrophenol	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
3+4 Methylphenol (cresol, m+p)	33	U	33	32	U	32	33	U	33	35	U	35
3,3'-Dichlorobenzidine	91	U	91	88	U	88	90	U	90	94	U	94
3-Nitroaniline	74	U	74	71	U	71	73	U	73	76	U	76
4,6-Dinitro-2-methylphenol	330	U	330	320	U	320	330	U	330	350	U	350
4-Bromophenylphenyl ether	19	U	19	19	U	19	19	U	19	20	U	20
4-Chloro-3-methylphenol	67	U	67	65	U	65	66	U	66	69	U	69
4-Chloroaniline	83	U	83	80	U	80	81	U	81	86	U	86
4-Chlorophenylphenyl ether	21	U	21	21	U	21	21	U	21	22	U	22
4-Nitroaniline	73	U	73	71	U	71	72	U	72	76	U	76
4-Nitrophenol	98	U	98	95	U	95	96	U	96	100	U	100
Acenaphthene	10	U	10	10	U	10	10	U	10	11	U	11
Acenaphthylene	17	U	17	17	U	17	17	U	17	18	U	18
Anthracene	17	U	17	17	U	17	17	U	17	18	U	18
Benzo(a)anthracene	20	U	20	20	U	20	20	U	20	21	U	21
Benzo(a)pyrene	20	U	20	20	U	20	20	U	20	21	U	21
Benzo(b)fluoranthene	27	U	27	26	U	26	26	U	26	27	U	27
Benzo(ghi)perylene	16	U	16	16	U	16	16	U	16	17	U	17
Benzo(k)fluoranthene	40	U	40	39	U	39	40	U	40	42	U	42
Bis(2-chloro-1-methylethyl)ether	23	U	23	23	U	23	23	U	23	24	U	24
Bis(2-Chloroethoxy)methane	23	U	23	23	U	23	23	U	23	24	U	24
Bis(2-chloroethyl) ether	17	U	17	16	U	16	17	U	17	17	U	17
Bis(2-ethylhexyl) phthalate	47	U	47	45	U	45	46	U	46	48	U	48
Butylbenzylphthalate	44	U	44	42	U	42	43	U	43	45	U	45
Carbazole	36	U	36	35	U	35	36	U	36	38	U	38
Chrysene	27	U	27	26	U	26	27	U	27	28	U	28
Di-n-butylphthalate	29	U	29	28	U	28	29	U	29	30	U	30
Di-n-octylphthalate	15	U	15	14	U	14	14	U	14	15	U	15
Dibenz[a,h]anthracene	19	U	19	19	U	19	19	U	19	20	U	20
Dibenzofuran	20	U	20	20	U	20	20	U	20	21	U	21
Diethyl phthalate	26	U	26	25	U	25	26	U	26	27	U	27
Dimethyl phthalate	23	U	23	23	U	23	23	U	23	24	U	24
Fluoranthene	36	U	36	35	U	35	36	U	36	38	U	38
Fluorene	18	U	18	18	U	18	18	U	18	19	U	19

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V2			J1P1V3			J1P1V4			J1P1V5		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Hexachlorobenzene	29	U	29	28	U	28	29	U	29	30	U	30
Hexachlorobutadiene	10	U	10	9.8	U	9.8	9.9	U	9.9	10	U	10
Hexachlorocyclopentadiene	51	U	51	49	U	49	50	U	50	52	U	52
Hexachloroethane	22	U	22	21	U	21	21	U	21	22	U	22
Indeno(1,2,3-cd)pyrene	22	U	22	22	U	22	22	U	22	23	U	23
Isophorone	17	U	17	17	U	17	17	U	17	18	U	18
N-Nitroso-di-n-dipropylamine	31	U	31	30	U	30	31	U	31	32	U	32
N-Nitrosodiphenylamine	21	U	21	21	U	21	21	U	21	22	U	22
Naphthalene	31	U	31	30	U	30	31	U	31	32	U	32
Nitrobenzene	22	U	22	22	U	22	22	U	22	23	U	23
Pentachlorophenol	330	U	330	320	U	320	330	U	330	350	U	350
Phenanthrene	17	U	17	17	U	17	17	U	17	18	U	18
Phenol	18	U	18	18	U	18	18	U	18	19	U	19
Pyrene	12	U	12	12	U	12	12	U	12	13	U	13

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V6			J1P1V7			J1P1V8			J1P1V9		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	10	U	10	10	U	10	9.7	U	9.7
Acenaphthylene	9.3	U	9.3	9	U	9	9.4	U	9.4	8.7	U	8.7
Anthracene	3.1	U	3.1	3	U	3	3.2	U	3.2	2.9	U	2.9
Benzo(a)anthracene	3.3	U	3.3	10	JX	3.2	3.3	U	3.3	3.1	U	3.1
Benzo(a)pyrene	6.6	U	6.6	6.4	J	6.4	6.7	U	6.7	6.2	U	6.2
Benzo(b)fluoranthene	4.3	U	4.3	9.5	J	4.2	4.4	U	4.4	4.1	U	4.1
Benzo(ghi)perylene	7.4	U	7.4	7.2	U	7.2	7.5	U	7.5	7	U	7
Benzo(k)fluoranthene	4.1	U	4.1	3.9	U	3.9	4.1	U	4.1	3.8	U	3.8
Chrysene	5	U	5	19	J	4.8	5.1	U	5.1	4.7	U	4.7
Dibenz[a,h]anthracene	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	13	U	13	20	J	13	14	U	14	13	U	13
Fluorene	5.4	U	5.4	5.3	U	5.3	5.5	U	5.5	5.1	U	5.1
Indeno(1,2,3-cd)pyrene	12	U	12	12	U	12	13	U	13	12	U	12
Naphthalene	12	U	12	12	U	12	13	U	13	12	U	12
Phenanthrene	12	U	12	12	U	12	13	U	13	12	U	12
Pyrene	12	U	12	27	J	12	13	U	13	12	U	12
Pesticides												
Aldrin	0.25	U	0.25	0.25	U	0.25	0.26	U	0.26	0.25	U	0.25
Alpha-BHC	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.21	U	0.21
alpha-Chlordane	0.32	U	0.32	0.32	U	0.32	0.34	U	0.34	0.32	U	0.32
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.66	U	0.66	0.66	U	0.66	0.7	U	0.7	0.67	U	0.67
Delta-BHC	0.4	U	0.4	0.4	U	0.4	0.42	U	0.42	0.4	U	0.4
Dichlorodiphenyldichloroethane	0.54	U	0.54	0.54	U	0.54	0.57	U	0.57	0.55	U	0.55
Dichlorodiphenyldichloroethylene	0.51	J	0.24	0.24	U	0.24	0.25	U	0.25	0.24	U	0.24
Dichlorodiphenyltrichloroethane	0.58	U	0.58	0.58	U	0.58	0.62	U	0.62	0.59	U	0.59
Dieldrin	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.21	U	0.21
Endosulfan I	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18	0.18	U	0.18
Endosulfan II	0.28	U	0.28	0.28	U	0.28	0.3	U	0.3	0.29	U	0.29
Endosulfan sulfate	0.27	U	0.27	0.27	U	0.27	0.29	U	0.29	0.28	U	0.28
Endrin	0.3	U	0.3	0.3	U	0.3	0.32	U	0.32	0.31	U	0.31
Endrin aldehyde	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18	0.17	U	0.17
Endrin ketone	0.48	U	0.48	0.48	U	0.48	0.51	U	0.51	0.49	U	0.49
Gamma-BHC (Lindane)	0.46	U	0.46	0.46	U	0.46	0.49	U	0.49	0.47	U	0.47
gamma-Chlordane	0.26	U	0.26	0.26	U	0.26	0.28	U	0.28	0.27	U	0.27
Heptachlor	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.21	U	0.21
Heptachlor epoxide	0.42	U	0.42	0.42	U	0.42	0.45	U	0.45	0.43	U	0.43
Methoxychlor	0.45	U	0.45	0.44	U	0.44	0.47	U	0.47	0.45	U	0.45
Toxaphene	16	U	16	16	U	16	17	U	17	16	U	16

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V6			J1P1V7			J1P1V8			J1P1V9		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	29	U	29	28	U	28	29	U	29	28	U	28
1,2-Dichlorobenzene	23	U	23	22	U	22	23	U	23	22	U	22
1,3-Dichlorobenzene	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	14	U	14	14	U	14	14	U	14	13	U	13
2,4,5-Trichlorophenol	10	U	10	10	U	10	10	U	10	9.9	U	9.9
2,4,6-Trichlorophenol	10	U	10	10	U	10	10	U	10	9.9	U	9.9
2,4-Dichlorophenol	10	U	10	10	U	10	10	U	10	9.9	U	9.9
2,4-Dimethylphenol	68	U	68	67	U	67	68	U	68	65	U	65
2,4-Dinitrophenol	340	UX	340	340	U	340	350	U	350	330	U	330
2,4-Dinitrotoluene	68	U	68	67	U	67	68	U	68	65	U	65
2,6-Dinitrotoluene	29	U	29	28	U	28	29	U	29	28	U	28
2-Chloronaphthalene	10	U	10	10	U	10	10	U	10	9.9	U	9.9
2-Chlorophenol	21	U	21	21	U	21	22	U	22	21	U	21
2-Methylnaphthalene	19	U	19	19	U	19	20	U	20	19	U	19
2-Methylphenol (cresol, o-)	13	U	13	13	U	13	13	U	13	13	U	13
2-Nitroaniline	51	U	51	51	U	51	52	U	52	50	U	50
2-Nitrophenol	10	U	10	10	U	10	10	U	10	9.9	U	9.9
3+4 Methylphenol (cresol, m+p)	34	U	34	33	U	33	34	U	34	33	U	33
3,3'-Dichlorobenzidine	92	U	92	91	U	91	93	U	93	89	U	89
3-Nitroaniline	75	U	75	74	U	74	76	U	76	72	U	72
4,6-Dinitro-2-methylphenol	340	U	340	330	U	330	340	U	340	330	U	330
4-Bromophenylphenyl ether	19	U	19	19	U	19	20	U	20	19	U	19
4-Chloro-3-methylphenol	68	U	68	67	U	67	68	U	68	65	U	65
4-Chloroaniline	84	U	84	83	U	83	85	U	85	81	U	81
4-Chlorophenylphenyl ether	21	U	21	21	U	21	22	U	22	21	U	21
4-Nitroaniline	74	U	74	73	U	73	75	U	75	72	U	72
4-Nitrophenol	99	U	99	98	U	98	100	U	100	96	U	96
Acenaphthene	11	U	11	10	U	10	11	U	11	10	U	10
Acenaphthylene	17	U	17	17	U	17	18	U	18	17	U	17
Anthracene	17	U	17	17	U	17	18	U	18	17	U	17
Benzo(a)anthracene	20	U	20	20	U	20	21	U	21	20	U	20
Benzo(a)pyrene	20	U	20	20	U	20	21	U	21	20	U	20
Benzo(b)fluoranthene	27	U	27	26	U	26	27	U	27	26	U	26
Benzo(ghi)perylene	16	U	16	16	U	16	17	U	17	16	U	16
Benzo(k)fluoranthene	41	U	41	40	U	40	41	U	41	40	U	40
Bis(2-chloro-1-methylethyl)ether	24	U	24	23	U	23	24	U	24	23	U	23
Bis(2-Chloroethoxy)methane	24	U	24	23	U	23	24	U	24	23	U	23
Bis(2-chloroethyl) ether	17	U	17	17	U	17	17	U	17	16	U	16
Bis(2-ethylhexyl) phthalate	47	U	47	46	U	46	48	U	48	46	U	46
Butylbenzylphthalate	44	U	44	43	U	43	45	U	45	43	U	43
Carbazole	37	U	37	36	U	36	37	U	37	36	U	36
Chrysene	28	U	28	27	U	27	28	U	28	27	U	27
Di-n-butylphthalate	30	U	30	29	U	29	30	U	30	29	U	29
Di-n-octylphthalate	15	U	15	15	U	15	15	U	15	14	U	14
Dibenz[a,h]anthracene	19	U	19	19	U	19	20	U	20	19	U	19
Dibenzofuran	20	U	20	20	U	20	21	U	21	20	U	20
Diethyl phthalate	27	U	27	26	U	26	27	U	27	26	U	26
Dimethyl phthalate	24	U	24	23	U	23	24	U	24	23	U	23
Fluoranthene	37	U	37	36	U	36	37	U	37	36	U	36
Fluorene	18	U	18	18	U	18	19	U	19	18	U	18

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1V6			J1P1V7			J1P1V8			J1P1V9		
	5/3/2012			5/3/2012			5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Hexachlorobenzene	30	U	30	29	U	29	30	U	30	29	U	29
Hexachlorobutadiene	10	U	10	10	U	10	10	U	10	9.9	U	9.9
Hexachlorocyclopentadiene	51	U	51	51	U	51	52	U	52	50	U	50
Hexachloroethane	22	U	22	22	U	22	22	U	22	21	U	21
Indeno(1,2,3-cd)pyrene	23	U	23	22	U	22	23	U	23	22	U	22
Isophorone	17	U	17	17	U	17	18	U	18	17	U	17
N-Nitroso-di-n-dipropylamine	32	U	32	31	U	31	32	U	32	31	U	31
N-Nitrosodiphenylamine	21	U	21	21	U	21	22	U	22	21	U	21
Naphthalene	32	U	32	31	U	31	32	U	32	31	U	31
Nitrobenzene	23	U	23	22	U	22	23	U	23	22	U	22
Pentachlorophenol	340	U	340	330	U	330	340	U	340	330	U	330
Phenanthrene	17	U	17	17	U	17	18	U	18	17	U	17
Phenol	18	U	18	18	U	18	19	U	19	18	U	18
Pyrene	12	U	12	12	U	12	13	U	13	12	U	12

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1W0			J1P1W1		
	5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs						
Acenaphthene	10	U	10	10	U	10
Acenaphthylene	9.1	U	9.1	9.1	U	9.1
Anthracene	3.1	U	3.1	3.1	U	3.1
Benzo(a)anthracene	3.2	U	3.2	3.2	U	3.2
Benzo(a)pyrene	6.5	U	6.5	6.5	U	6.5
Benzo(b)fluoranthene	4.3	U	4.3	4.2	U	4.2
Benzo(ghi)perylene	7.3	U	7.3	7.3	U	7.3
Benzo(k)fluoranthene	4	U	4	4	U	4
Chrysene	4.9	U	4.9	4.9	U	4.9
Dibenz[a,h]anthracene	11	U	11	11	U	11
Fluoranthene	13	U	13	13	U	13
Fluorene	5.4	U	5.4	5.3	U	5.3
Indeno(1,2,3-cd)pyrene	12	U	12	12	U	12
Naphthalene	12	U	12	12	U	12
Phenanthrene	12	U	12	12	U	12
Pyrene	12	U	12	12	U	12
Pesticides						
Aldrin	0.25	U	0.25	0.25	U	0.25
Alpha-BHC	0.21	U	0.21	0.22	U	0.22
alpha-Chlordane	0.32	U	0.32	0.33	U	0.33
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.66	U	0.66	0.67	U	0.67
Delta-BHC	0.4	U	0.4	0.41	U	0.41
Dichlorodiphenyldichloroethane	0.54	U	0.54	0.55	U	0.55
Dichlorodiphenyldichloroethylene	0.23	U	0.23	0.24	U	0.24
Dichlorodiphenyltrichloroethane	0.58	U	0.58	0.6	U	0.6
Dieldrin	0.21	U	0.21	0.21	U	0.21
Endosulfan I	0.17	U	0.17	0.18	U	0.18
Endosulfan II	0.28	U	0.28	0.29	U	0.29
Endosulfan sulfate	0.27	U	0.27	0.28	U	0.28
Endrin	0.3	U	0.3	0.31	U	0.31
Endrin aldehyde	0.17	U	0.17	0.17	U	0.17
Endrin ketone	0.48	U	0.48	0.49	U	0.49
Gamma-BHC (Lindane)	0.46	U	0.46	0.47	U	0.47
gamma-Chlordane	0.26	U	0.26	0.27	U	0.27
Heptachlor	0.21	U	0.21	0.22	U	0.22
Heptachlor epoxide	0.42	U	0.42	0.43	U	0.43
Methoxychlor	0.44	U	0.44	0.45	U	0.45
Toxaphene	16	U	16	16	U	16

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1W0			J1P1W1		
	5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs						
1,2,4-Trichlorobenzene	27	U	27	28	U	28
1,2-Dichlorobenzene	22	U	22	22	U	22
1,3-Dichlorobenzene	12	U	12	12	U	12
1,4-Dichlorobenzene	13	U	13	14	U	14
2,4,5-Trichlorophenol	9.8	U	9.8	10	U	10
2,4,6-Trichlorophenol	9.8	U	9.8	10	U	10
2,4-Dichlorophenol	9.8	U	9.8	10	U	10
2,4-Dimethylphenol	65	U	65	66	U	66
2,4-Dinitrophenol	330	U	330	330	U	330
2,4-Dinitrotoluene	65	U	65	66	U	66
2,6-Dinitrotoluene	27	U	27	28	U	28
2-Chloronaphthalene	9.8	U	9.8	10	U	10
2-Chlorophenol	21	U	21	21	U	21
2-Methylnaphthalene	19	U	19	19	U	19
2-Methylphenol (cresol, o-)	13	U	13	13	U	13
2-Nitroaniline	49	U	49	50	U	50
2-Nitrophenol	9.8	U	9.8	10	U	10
3+4 Methylphenol (cresol, m+p)	32	U	32	33	U	33
3,3'-Dichlorobenzidine	88	U	88	90	U	90
3-Nitroaniline	71	U	71	73	U	73
4,6-Dinitro-2-methylphenol	320	U	320	330	U	330
4-Bromophenylphenyl ether	19	U	19	19	U	19
4-Chloro-3-methylphenol	65	U	65	66	U	66
4-Chloroaniline	80	U	80	82	U	82
4-Chlorophenylphenyl ether	21	U	21	21	U	21
4-Nitroaniline	71	U	71	73	U	73
4-Nitrophenol	95	U	95	97	U	97
Acenaphthene	10	U	10	10	U	10
Acenaphthylene	17	U	17	17	U	17
Anthracene	17	U	17	17	U	17
Benzo(a)anthracene	20	U	20	20	U	20
Benzo(a)pyrene	20	U	20	20	U	20
Benzo(b)fluoranthene	26	U	26	26	U	26
Benzo(ghi)perylene	16	U	16	16	U	16
Benzo(k)fluoranthene	39	U	39	40	U	40
Bis(2-chloro-1-methylethyl)ether	22	U	22	23	U	23
Bis(2-Chloroethoxy)methane	22	U	22	23	U	23
Bis(2-chloroethyl) ether	16	U	16	17	U	17
Bis(2-ethylhexyl) phthalate	45	U	45	46	U	46
Butylbenzylphthalate	42	U	42	43	U	43
Carbazole	35	U	35	36	U	36
Chrysene	26	U	26	27	U	27
Di-n-butylphthalate	28	U	28	29	U	29
Di-n-octylphthalate	14	U	14	14	U	14
Dibenz[a,h]anthracene	19	U	19	19	U	19
Dibenzofuran	20	U	20	20	U	20
Diethyl phthalate	25	U	25	26	U	26
Dimethyl phthalate	22	U	22	23	U	23
Fluoranthene	35	U	35	36	U	36

Table C-4. 100-D-66 In-process Sample Results - Organics. (18 Pages)

Constituent	J1P1W0			J1P1W1		
	5/3/2012			5/3/2012		
	µg/kg	Q	PQL	µg/kg	Q	PQL
Fluorene	18	U	18	18	U	18
Hexachlorobenzene	28	U	28	29	U	29
Hexachlorobutadiene	9.8	U	9.8	10	U	10
Hexachlorocyclopentadiene	49	U	49	50	U	50
Hexachloroethane	21	U	21	21	U	21
Indeno(1,2,3-cd)pyrene	22	U	22	22	U	22
Isophorone	17	U	17	17	U	17
N-Nitroso-di-n-dipropylamine	30	U	30	31	U	31
N-Nitrosodiphenylamine	21	U	21	21	U	21
Naphthalene	30	U	30	31	U	31
Nitrobenzene	22	U	22	22	U	22
Pentachlorophenol	320	U	320	330	U	330
Phenanthrene	17	U	17	17	U	17
Phenol	18	U	18	18	U	18
Pyrene	12	U	12	12	U	12

APPENDIX D

CALCULATION BRIEFS

APPENDIX D

CALCULATION BRIEFS

The calculations in this appendix are kept in the active Washington Closure Hanford project files and are available upon request. When the project is completed, the file 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 Calculation," Washington Closure Hanford, Richland, Washington. The following calculations are provided in this appendix.

100-D-66 Waste Site Cleanup Verification 95% UCL Calculations, 0100D-CA-V0479, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation, 0100D-CA-V0480, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater, 0100D-CA-V0481, Rev. 0, Washington Closure Hanford, Richland, Washington.

<u>DISCLAIMER FOR CALCULATIONS</u>

The calculations 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 Field Remediation **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0479

Subject: 100-D-66 Waste Site Cleanup Verification 95% UCL Calculation

Computer Program: Excel Program No: Excel 2003

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 = 23 Attm. 1 = 23 Total = 47	J. D. Skoglie [signature]	N. K. Schiffern [signature]	C. H. Dobie [signature]	D. F. Obenauer [signature]	1/24/13

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** 09/27/12	**Calc. No.** 0100D-CA-V0479	**Rev. No.** 0
Project 100-D Field Remediation	**Job No.** 14655	**Checked** N. K. Schiffern	**Date** 09/27/12
Subject 100-D-66 Waste Site Upland Portion Cleanup Verification 95% UCL Calculations			**Sheet No.** 1 of 23

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 5 - Calculation Sheet Summary
Sheets 6 to 15 - Calculation Sheet Verification Data - Excavation and Waste Staging Area Footprints
Sheets 16 to 21 - Ecology Software (MTCAStat) Results
Sheet 22 to 23 - Calculation Sheet - Duplicate Analysis
Attachment 1 - 100-D-66, Verification Sampling Results (23 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-66 waste site. The data were entered into an EXCEL 2003 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 this site.

Methodology:

The 100-D-66 waste site underwent statistical sampling that consists of two decision units for verification sampling; the excavation and waste staging area footprint.

Analytical results for all sampling locations are summarized in the tables provided on sheets 4 and 5. For polycyclic aromatic hydrocarbons (PAHs), two separate analyses were performed that provided data: 8310 (PAH specific) and 8270 (semi volatile organics). Only data from the 8310 PAH specific analysis are evaluated for cleanup and included in the results summary table(s). However, PAH data from both analyses is evaluated for the RPD calculation. Further information of the sample data quality is presented in the data quality assessment section of the associated RSVP.

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie **Date** 09/27/12 **Calc. No.** 0100D-CA-V0479 **Rev. No.** 0
Project 100-D Field Remediation **Job No.** 14655 **Checked** N. K. Schiffern **Date** 09/27/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 2 of 23

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. The 95% UCL values were not calculated for potassium-40, radium-226, radium-228, thorium-228, and thorium-232 based on the natural occurence at the Hanford Site.

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.

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie	**Date** 09/27/12	**Calc. No.** 0100D-CA-V0479		**Rev. No.** 0	
Project 100-D Field Remediation	**Job No.** 14655	**Checked** N. K. Schiffern		**Date** 09/27/12	
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations				**Sheet No.** 3 of 23	

Summary (continued)

QUALIFIER LIST

B = blank contamination
D = dilution
J = estimate
U = undetected

ACRONYM LIST

-- = not applicable
DE = direct exposure
GW = groundwater
MTCA = *Model Toxics Control Act*
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
TDL = target detection limit
UCL = upper confidence limit
WAC = Washington Administrative Code

Washington Closure Hanford	**CALCULATION SHEET**		
Originator J. D. Skoglie	**Date** 10/03/12	**Calc. No.** 0100D-CA-V0479	**Rev. No.** 0
Project 100-D Field Remediation	**Job No.** 14655	**Checked** N. K. Schiffern	**Date** 10/03/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 4 of 23

Results:

The results presented in the tables that follow include the summary of the results of the 95% UCL calculations for the excavation (A), waste staging area footprint (B), 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 [a]

Analyte	A - Excavation		B - Waste Staging Area Footprints		Units
	95% UCL Result	Maximum Result	95% UCL Result	Maximum Result	
Carbon-14	1.20	--	1.54	--	pCi/g
Cesium-137	0.823	--	0.260	--	pCi/g
Cobalt-60	--	--	0.017	--	pCi/g
Europium-152	0.565	--	0.231	--	pCi/g
Europium-154	0.059	--	0.045	--	pCi/g
Nickel-63	5.66	--	1.13	--	pCi/g
Plutonium-238	0.135	--	--	--	pCi/g
Plutonium-239/240	0.659	--	--	--	pCi/g
Total beta radiostrontium	--	--	0.155	--	pCi/g
Tritium	3.43	--	--	--	pCi/g
Uranium-233/234	0.673	--	0.562	--	pCi/g
Uranium-238 (AEA)	0.638	--	0.608	--	pCi/g
Antimony	--	--	--	0.353	mg/kg
Arsenic	2.74	--	3.04	--	mg/kg
Barium	71.1	--	61.5	--	mg/kg
Beryllium	0.339	--	0.256	--	mg/kg
Boron	1.12	--	1.16	--	mg/kg
Cadmium	0.0860	--	0.0840	--	mg/kg
Chromium	18.4	--	12.5	--	mg/kg
Cobalt	6.22	--	5.83	--	mg/kg
Copper	13.7	--	13.2	--	mg/kg
Hexavalent chromium	--	0.43	--	--	mg/kg
Lead	4.16	--	3.27	--	mg/kg
Manganese	268	--	265	--	mg/kg
Mercury	--	0.274	--	0.0175	mg/kg
Molybdenum	0.461	--	0.365	--	mg/kg
Nickel	10.8	--	10.5	--	mg/kg
Vanadium	50.5	--	48.4	--	mg/kg
Zinc	40.6	--	37.6	--	mg/kg
Chloride	35.5	--	7.8	--	mg/kg
Fluoride	--	--	--	2.8	mg/kg
Nitrogen in Nitrate	31.2	--	13.9	--	mg/kg
Nitrogen in Nitrate and nitrite	22.3	--	17.4	--	mg/kg
Sulfate	264	--	63.4	--	mg/kg
Acenaphthene	--	19.0	--	11.4	ug/kg
Acenaphthylene	--	44.5	--	1320	ug/kg
Anthracene	--	10.8	--	--	ug/kg
Benzo(a)anthracene	28.4	--	5.81	--	ug/kg
Benzo(a)pyrene	17.4	--	--	10.5	ug/kg
Benzo(b)fluoranthene	15.4	--	4.72	--	ug/kg
Benzo(ghi)perylene	12.7	--	3.94	--	ug/kg
Benzo(k)fluoranthene	--	28.9	--	4.51	ug/kg
Chrysene	--	111	7.20	--	ug/kg
Dibenz(a,h)anthracene	--	6.74	--	--	ug/kg
Fluorene	--	--	--	9.78	ug/kg
Fluoranthene	38.7	--	9.51	--	ug/kg
Indeno(1,2,3-cd)pyrene	9.69	--	3.63	--	ug/kg
Naphthalene	29.3	--	--	20.3	ug/kg
Phenanthrene	--	46.9	--	15.5	ug/kg
Pyrene	32.8	--	7.55	--	ug/kg
WAC 173-340-740(7)(e) Evaluation:					
WAC 173-340 3-Part Test for most stringent RAG:	A		B		
95% UCL or maximum> Cleanup Limit?	YES	YES	NO	NO	
> 10% above Cleanup Limit?	YES	NO	NO	NO	
Any sample > 2x Cleanup Limit?	YES	NO	NO	NO	

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

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie Calc. No. 0100D-CA-V0479 Rev. No. 0
Project 100-D Field Remediation Checked N. K. Schiffern Date 10/02/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations Sheet No. 5 of 23

Summary (continued)

Results:
The results presented in the tables that follow include the summary of the results of the 95% UCL calculations for the excavation (A), waste staging area footprint (B), 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.

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

Analyte	Duplicate Analysis	
	Excavation	Waste Staging Area
Potassium-40	13.1%	21.4%
Radium-226	9.2%	--
Aluminum	1.7%	10.2%
Barium	21.6%	**34.7%**
Calcium	18.1%	2.2%
Chromium	**45.6%**	6.4%
Copper	13.0%	10.9%
Iron	16.5%	2.1%
Magnesium	0.3%	2.5%
Manganese	9.9%	2.7%
Silicon	3.2%	7.7%
Sodium	--	4.6%
Vanadium	**33.6%**	0.8%
Zinc	14.2%	1.3%

Grey cells indicate not applicable.
[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 CVP.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 6 of 23

100-D-66 Statistical Calculations

Verification Data - Excavation

Sample Area	Sample Number	Sample Date	Carbon-14			Cesium-137			Europium-152			Europium-154			Nickel-63		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	1.40	J	0.888	0.100		0.066	0.147	U	0.147	0.189	U	0.189	-0.532	U	3.32
Duplicate of J1PXK0	J1PXK2	8/15/12	0.903	J	0.859	0.054		0.037	0.093	U	0.093	0.127	U	0.127	-1.99	U	3.52
A-1	J1PXJ0	8/15/12	0.714	UJ	0.923	0.007	U	0.007	0.019	U	0.019	0.024	U	0.024	0.685	U	3.47
A-2	J1PXJ1	8/15/12	1.09	J	0.882	0.016	U	0.016	0.041	U	0.041	0.056	U	0.056	0.044	U	3.53
A-3	J1PXJ2	8/15/12	1.14	J	0.847	0.030		0.006	0.034		0.022	0.022	U	0.022	6.21		3.31
A-4	J1PXJ3	8/15/12	0.960	J	0.913	0.006	U	0.006	0.015	U	0.015	0.020	U	0.020	0.082	U	3.32
A-5	J1PXJ4	8/15/12	0.948	J	0.919	0.056		0.012	0.020		0.019	0.034	U	0.034	-1.11	U	3.60
A-6	J1PXJ5	8/15/12	1.05	J	0.924	0.008	U	0.008	0.025	U	0.025	0.029	U	0.029	-0.331	U	3.36
A-7	J1PXJ6	8/15/12	1.46	J	0.931	1.14		0.046	2.14		0.101	0.146		0.118	17.8		3.38
A-8	J1PXJ7	8/15/12	1.68	J	0.851	2.78		0.033	0.514		0.076	0.075	U	0.075	1.92	U	3.45
A-9	J1PXJ8	8/15/12	1.11	J	0.839	0.026	U	0.026	0.072	U	0.072	0.090	U	0.090	-0.838	U	3.40
A-10	J1PXJ9	8/15/12	0.669	UJ	0.839	0.933		0.038	0.375		0.078	0.105	U	0.105	0.800	U	3.24
A-12	J1PXK1	8/15/12	0.813	UJ	0.845	0.053		0.025	0.072		0.055	0.063	U	0.063	-1.54	U	3.48

Sample Area	Sample Number	Sample Date	Plutonium-238			Plutonium-239/240			Tritium			Uranium-233/234			Uranium-238 (AEA)		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	0	U	0.232	0	U	0.232	1.67	UJ	3.75	0.478		0.282	0.589		0.282
Duplicate of J1PXK0	J1PXK2	8/15/12	-0.029	U	0.220	0	U	0.220	0.720	UJ	3.83	0.812		0.222	0.580		0.222
A-1	J1PXJ0	8/15/12	0.014	U	0.038	-0.003	U	0.033	-0.059	UJ	3.75	0.569		0.182	0.498		0.182
A-2	J1PXJ1	8/15/12	0.300		0.050	2.51		0.035	-0.237	UJ	3.46	0.491		0.188	0.467		0.188
A-3	J1PXJ2	8/15/12	0	U	0.039	0	U	0.024	1.82	UJ	3.42	0.925		0.165	0.947		0.165
A-4	J1PXJ3	8/15/12	0.009	U	0.047	-0.003	U	0.029	0.576	UJ	3.36	0.324		0.206	0.513		0.206
A-5	J1PXJ4	8/15/12	0.026	U	0.201	0.158	U	0.201	1.42	UJ	3.77	0.676		0.192	0.676		0.192
A-6	J1PXJ5	8/15/12	0	U	0.239	0.125	U	0.239	0	UJ	3.57	0.739		0.226	0.502		0.226
A-7	J1PXJ6	8/15/12	0.027	U	0.207	0.298		0.207	1.97	UJ	3.97	0.496		0.253	0.694		0.253
A-8	J1PXJ7	8/15/12	0.026	U	0.197	0.206		0.197	0.512	UJ	3.32	0.433		0.207	0.568		0.207
A-9	J1PXJ8	8/15/12	-0.026	U	0.202	0.264		0.202	9.16	J	5.19	0.602		0.184	0.482		0.184
A-10	J1PXJ9	8/15/12	0.024	U	0.181	0.189		0.181	0.948	UJ	3.69	0.779		0.192	0.502		0.192
A-12	J1PXK1	8/15/12	0	U	0.222	0	U	0.222	0.442	UJ	3.69	0.425		0.217	0.368		0.217

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Carbon-14 pCi/g	Cesium-137 pCi/g	Europium-152 pCi/g	Europium-154 pCi/g	Nickel-63 pCi/g	Plutonium-238 pCi/g	Plutonium-239/240 pCi/g	Tritium pCi/g	Uranium-233/234 pCi/g	Uranium-238 (AEA) pCi/g
A-11	J1PXK0/ J1PXK2	8/15/12	1.15	0.077	0.060	0.079	1.71	0.113	0.113	1.90	0.645	0.585
A-1	J1PXJ0	8/15/12	0.714	0.004	0.010	0.012	1.74	0.019	0.017	1.88	0.569	0.498
A-2	J1PXJ1	8/15/12	1.09	0.008	0.021	0.028	1.77	0.300	2.51	1.73	0.491	0.467
A-3	J1PXJ2	8/15/12	1.14	0.030	0.034	0.011	6.21	0.020	0.012	1.71	0.925	0.947
A-4	J1PXJ3	8/15/12	0.960	0.003	0.008	0.010	1.66	0.024	0.015	1.68	0.324	0.513
A-5	J1PXJ4	8/15/12	0.948	0.056	0.020	0.017	1.80	0.101	0.10	1.89	0.676	0.676
A-6	J1PXJ5	8/15/12	1.05	0.004	0.013	0.015	1.68	0.120	0.120	1.79	0.739	0.502
A-7	J1PXJ6	8/15/12	1.46	1.14	2.14	0.146	17.8	0.104	0.298	1.99	0.496	0.694
A-8	J1PXJ7	8/15/12	1.68	2.78	0.514	0.038	1.73	0.099	0.206	1.66	0.433	0.568
A-9	J1PXJ8	8/15/12	1.11	0.013	0.036	0.045	1.70	0.101	0.264	9.16	0.602	0.482
A-10	J1PXJ9	8/15/12	0.669	0.933	0.375	0.053	1.62	0.091	0.189	1.85	0.779	0.502
A-12	J1PXK1	8/15/12	0.813	0.053	0.072	0.032	1.74	0.111	0.111	1.85	0.425	0.368

Statistical Computations

	Carbon-14	Cesium-137	Europium-152	Europium-154	Nickel-63	Plutonium-238	Plutonium-239/240	Tritium	Uranium-233/234	Uranium-238 (AEA)
95% UCL based on	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.
N	12	12	12	12	12	12	12	12	12	12
% < Detection limit	25%	42%	50%	92%	83%	92%	58%	92%	0%	0%
Mean	1.07	0.425	0.275	0.040	3.43	0.100	0.330	2.42	0.592	0.567
Standard deviation	0.289	0.839	0.610	0.039	4.71	0.074	0.693	2.12	0.171	0.149
Z-statistic	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
95% UCL on mean	1.20	0.823	0.565	0.059	5.66	0.135	0.659	3.43	0.673	0.638
Maximum value	1.68	2.78	2.14	0.189	17.8	0.300	2.51	9.16	0.925	0.947

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 7 of 23

100-D-66 Statistical Calculations
Verification Data - Excavation

1	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead			Manganese		
2	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	mg/kg	Q	PQL
3	A-11	J1PXK0	8/15/12	2.28		0.855	69.8		0.427	0.303		0.171	0.520	B	1.71	0.0571	B	0.171	23.7		0.171	4.87		1.71	11.3		0.855	3.89		0.427	233		4.27
4	Duplicate of J1PXK0	J1PXK2	8/15/12	2.77		0.835	56.2		0.417	0.273		0.167	0.528	B	1.67	0.0558	B	0.167	14.9		0.167	3.83		1.67	9.92		0.835	4.08		0.417	211		4.17
5	A-1	J1PXJ0	8/15/12	2.80		0.839	48.3		0.420	0.185		0.168	0.763	B	1.68	0.0759	B	0.168	10.8		0.168	3.57		1.68	9.79		0.839	2.73		0.420	196		4.20
6	A-2	J1PXJ1	8/15/12	3.34		0.894	63.5		0.447	0.309		0.179	1.55	B	1.79	0.0675	B	0.179	12.0		0.179	6.09		1.79	12.1		0.894	4.23		0.447	282		4.47
7	A-3	J1PXJ2	8/15/12	2.60		0.816	77.7		0.408	0.289		0.163	1.41	B	1.63	0.0669	B	0.163	9.62		0.163	6.48		1.63	13.3		0.816	3.62		0.408	286		4.08
8	A-4	J1PXJ3	8/15/12	1.69		0.800	54.7		0.400	0.210		0.160	0.547	B	1.60	0.0516	B	0.160	6.27		0.160	6.98		1.60	13.6		0.800	2.54		0.400	298		4.00
9	A-5	J1PXJ4	8/15/12	3.14		0.803	90.0		0.401	0.448		0.161	1.70		1.61	0.0928	B	0.161	12.7		0.161	6.77		1.61	16.9		0.803	5.08		0.401	253		4.01
10	A-6	J1PXJ5	8/15/12	1.11		0.717	50.6		0.358	0.164		0.143	1.43	U	1.43	0.0481	B	0.143	3.63		0.143	6.06		1.43	11.1		0.717	1.87		0.358	247		3.58
11	A-7	J1PXJ6	8/15/12	2.64		0.989	64.7		0.494	0.320		0.198	0.752	B	1.98	0.164	B	0.198	26.0		0.198	5.79		1.98	14.2		0.989	4.13		0.494	273		4.94
12	A-8	J1PXJ7	8/15/12	2.34		0.730	52.0		0.365	0.252		0.146	0.660	B	1.46	0.0569	B	0.146	15.7		0.146	4.87		1.46	11.6		0.730	3.25		0.365	224		3.65
13	A-9	J1PXJ8	8/15/12	2.50		0.916	83.9		0.458	0.427		0.183	1.13	B	1.83	0.0604	B	0.183	11.0		0.183	6.47		1.83	14.6		0.916	4.27		0.458	245		4.58
14	A-10	J1PXJ9	8/15/12	2.56		0.981	54.2		0.491	0.276		0.196	0.720	B	1.96	0.0646	B	0.196	17.1		0.196	4.80		1.96	11.2		0.981	3.74		0.491	236		4.91
15	A-12	J1PXK1	8/15/12	1.67		0.708	58.3		0.354	0.227		0.142	0.575	B	1.42	0.0457	B	0.142	7.10		0.142	5.85		1.42	11.9		0.708	2.63		0.354	245		3.54

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
18	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
19	A-11	J1PXK0/ J1PXK2	8/15/12	2.53	63.0	0.288	0.524	0.0565	19.3	4.35	10.6	3.99	222
20	A-1	J1PXJ0	8/15/12	2.80	48.3	0.185	0.763	0.0759	10.8	3.57	9.8	2.73	196
21	A-2	J1PXJ1	8/15/12	3.34	63.5	0.309	1.55	0.0675	12.0	6.09	12.1	4.23	282
22	A-3	J1PXJ2	8/15/12	2.60	77.7	0.289	1.41	0.0669	9.62	6.48	13.3	3.62	286
23	A-4	J1PXJ3	8/15/12	1.69	54.7	0.210	0.547	0.0516	6.27	6.98	13.6	2.54	298
24	A-5	J1PXJ4	8/15/12	3.14	90.0	0.448	1.70	0.0928	12.7	6.77	16.9	5.08	253
25	A-6	J1PXJ5	8/15/12	1.11	50.6	0.164	0.715	0.0481	3.63	6.06	11.1	1.87	247
26	A-7	J1PXJ6	8/15/12	2.64	64.7	0.320	0.752	0.164	26.0	5.79	14.2	4.13	273
27	A-8	J1PXJ7	8/15/12	2.34	52.0	0.252	0.660	0.0569	15.7	4.87	11.6	3.25	224
28	A-9	J1PXJ8	8/15/12	2.50	83.9	0.427	1.130	0.0604	11.0	6.47	14.6	4.27	245
29	A-10	J1PXJ9	8/15/12	2.56	54.2	0.276	0.720	0.0646	17.1	4.80	11.2	3.74	236
30	A-12	J1PXK1	8/15/12	1.67	58.3	0.227	0.575	0.0457	7.10	5.85	11.9	2.63	245

31 **Statistical Computations**

32		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
33	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), 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), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat normal 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.
34	N	12	12	12	12	12	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%
36	Mean	2.41	63.4	0.283	0.921	0.0709	12.6	5.67	12.6	3.51	251
37	Standard deviation	0.636	13.6	0.0870	0.416	0.0320	6.18	1.05	2.01	0.920	29.8
38	95% UCL on mean	2.74	71.1	0.339	1.12	0.0860	18.4	6.22	13.7	4.16	268
39	Maximum value	3.34	90.0	0.448	1.70	0.164	26.0	6.98	16.9	5.08	298
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	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	10.2 GW & River Protection	512 GW & River Protection
41	**WAC 173-340 3-PART TEST**										
42	95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NO	NA	NA	NA	NA
43	> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	YES	NA	NA	NA	NA
44	Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NO	NA	NA	NA	NA
45	**WAC 173-340 Compliance?**	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.	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.	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.	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie Date 10/02/12 Calc. No. 0100D-CA-V0479 Rev. No. 0
Project 100-D Field Remediation Job No. 14655 Checked N. K. Schiffem Date 10/02/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations Sheet No. 8 of 23

100-D-66 Statistical Calculations
Verification Data - Excavation

1	Sample	Sample	Sample	Molybdenum			Nickel			Vanadium			Zinc			Chloride			Nitrogen in Nitrate [a]			Nitrogen in Nitrite and Nitrate			Sulfate			Benzo(a)anthracene			Benzo(a)pyrene		
2	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	ug/kg	Q	PQL	ug/kg	Q	PQL
3	A-11	J1PXK0	8/15/12	0.193	B	1.71	8.16		3.42	33.4		2.14	33.2		8.55	1.0	U	1.0	0.2	URJ	0.2	0.24	B	0.10	6.6		1.0	1.98	J	3.42	1.28	J	3.42
4	Duplicate of J1PXK0	J1PXK2	8/15/12	1.67	U	1.67	8.58		3.34	23.8		2.09	28.8		8.35	3.6	B	1.0	0.5	JB	0.2	0.61		0.08	22.4		1.0	1.13	J	3.43	3.43	U	3.43
5	A-1	J1PXJ0	8/15/12	0.272	B	1.68	8.86		3.36	26.8		2.10	25.5		8.39	1.0	B	0.9	0.2	JB	0.2	0.40	B	0.09	9.3		0.9	3.51	U	3.51	3.51	U	3.51
6	A-2	J1PXJ1	8/15/12	0.434	B	1.79	10.9		3.58	38.3		2.23	36.0		8.94	4.9		1.0	3.6	J	0.2	3.53		0.10	21.5		1.0	9.71		3.33	6.19		3.33
7	A-3	J1PXJ2	8/15/12	0.320	B	1.63	12.9		3.26	49.8		2.04	39.6		8.16	127	D	2.1	7.3	J	0.2	7.18		0.10	937		1.0	113		3.34	69.5		3.34
8	A-4	J1PXJ3	8/15/12	0.309	B	1.60	8.99		3.20	62.8		2.00	42.5		8.00	5.7		0.9	0.8	JB	0.2	0.86		0.09	10.3		0.9	3.27	U	3.27	3.27	U	3.27
9	A-5	J1PXJ4	8/15/12	0.273	B	1.61	11.5		3.21	47.3		2.01	45.0		8.03	1.1	B	1.0	5.8	J	0.2	5.58		0.10	25.2		1.0	3.16	J	3.34	1.09	J	3.34
10	A-6	J1PXJ5	8/15/12	0.321	B	1.43	7.14		2.87	60.6		1.79	39.0		7.17	8.1		0.9	1.9	J	0.2	1.90		0.09	210		0.9	3.28	U	3.28	3.28	U	3.28
11	A-7	J1PXJ6	8/15/12	0.263	B	1.98	11.8		3.95	43.5		2.47	42.3		9.89	48.7		0.9	25.3	JD	1.1	25.0	D	0.47	185	D	4.7	9.31		3.45	5.91		3.45
12	A-8	J1PXJ7	8/15/12	0.196	B	1.46	9.60		2.92	33.1		1.82	32.3		7.30	0.9	B	0.9	4.1	J	0.2	3.97		0.09	26.6		0.9	4.42		3.33	2.17	J	3.33
13	A-9	J1PXJ8	8/15/12	0.212	B	1.83	9.61		3.67	47.9		2.29	42.9		9.16	1.1	B	1.0	0.9	JB	0.2	0.84		0.10	7.3		1.0	3.28	U	3.28	3.28	U	3.28
14	A-10	J1PXJ9	8/15/12	1.96	U	1.96	10.3		3.93	31.4		2.45	32.4		9.81	1.4	B	0.9	1.4	J	0.2	1.28		0.09	16.2		0.9	9.42		3.30	3.87		3.30
15	A-12	J1PXK1	8/15/12	0.204	B	1.42	8.42		2.83	44.0		1.77	34.9		7.08	14.3		0.9	10.4	J	0.2	9.91	D	0.18	204		0.9	3.25	J	3.33	1.92	J	3.33

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Molybdenum	Nickel	Vanadium	Zinc	Chloride	Nitrogen in Nitrate [a]	Nitrogen in Nitrite and Nitrate	Sulfate	Benzo(a)anthracene	Benzo(a)pyrene
18	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg
19	A-11	J1PXK0/ J1PXK2	8/15/12	0.514	8.37	28.6	31.0	2.1	0.4	0.43	14.5	1.56	1.50
20	A-1	J1PXJ0	8/15/12	0.272	8.86	26.8	25.5	1.0	0.2	0.40	9.3	1.76	1.76
21	A-2	J1PXJ1	8/15/12	0.434	10.9	38.3	36.0	4.9	3.6	3.53	21.5	9.71	6.19
22	A-3	J1PXJ2	8/15/12	0.320	12.9	49.8	39.6	127	7.3	7.18	937	113	69.5
23	A-4	J1PXJ3	8/15/12	0.309	8.99	62.8	42.5	5.7	0.8	0.86	10.3	1.64	1.64
24	A-5	J1PXJ4	8/15/12	0.273	11.5	47.3	45.0	1.1	5.8	5.58	25.2	3.16	1.09
25	A-6	J1PXJ5	8/15/12	0.321	7.14	60.6	39.0	8.1	1.9	1.90	210	1.64	1.64
26	A-7	J1PXJ6	8/15/12	0.263	11.8	43.5	42.3	48.7	25.3	25.0	185	9.31	5.91
27	A-8	J1PXJ7	8/15/12	0.196	9.60	33.1	32.3	0.9	4.1	3.97	26.6	4.42	2.17
28	A-9	J1PXJ8	8/15/12	0.212	9.61	47.9	42.9	1.1	0.9	0.84	7.3	1.64	1.64
29	A-10	J1PXJ9	8/15/12	0.980	10.3	31.4	32.4	1.4	1.4	1.28	16.2	9.42	3.87
30	A-12	J1PXK1	8/15/12	0.204	8.42	44.0	34.9	14.3	10.4	9.91	204	3.25	1.92

31 **Statistical Computations**

32		Molybdenum	Nickel	Vanadium	Zinc	Chloride	Nitrogen in Nitrate [a]	Nitrogen in Nitrite and Nitrate	Sulfate	Benzo(a)anthracene	Benzo(a)pyrene
33	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), 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.
34	N	12	12	12	12	12	12	12	12	12	12
35	% < Detection limit	8%	0%	0%	0%	0%	0%	0%	0%	33%	33%
36	Mean	0.358	9.87	42.8	37.0	18.0	5.2	5.07	139	13.4	8.23
37	Standard deviation	0.217	1.67	11.7	5.91	36.9	7.1	6.96	264	31.5	19.4
38	95% UCL on mean	0.461	10.8	50.5	40.6	35.5	31.2	22.3	264	28.4	17.4
39	Maximum value	0.434	12.9	62.8	45.0	127	25.3	25.0	937	113	69.5
40	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise	8 GW Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	25000 GW Protection	1000 GW Protection	1000 GW Protection	25000 GW Protection	15 ug/kg GW and River Protection	15 ug/kg GW and River Protection
41	WAC 173-340 3-PART TEST										
42	95% UCL > Cleanup Limit?	NO	NA	NA	NA	NO	NO	NO	NO	YES	YES
43	> 10% above Cleanup Limit?	NO	NA	NA	NA	NO	NO	NO	NO	NO	NO
44	Any sample > 2X Cleanup Limit?	NO	NA	NA	NA	NO	NO	NO	NO	YES	YES
45	WAC 173-340 Compliance?	The data set meets the 3-part test criteria when compared to the most stringent RAG.	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.	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.	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.

Acronyms and qualifiers are defined on sheet 3.
[a] Nitrate has been converted to nitrogen in nitrate

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 9 of 23

100-D-66 Statistical Calculations
Verification Data - Excavation

	Sample Area	Sample Number	Sample Date	Benzo(b)fluoranthene			Benzo(ghi)perylene			Fluoranthene			Indeno(1,2,3-cd)pyrene			Naphthalene			Pyrene		
2				ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
3	A-11	J1PXK0	8/15/12	3.42	U	3.42	3.42	U	3.42	1.92	J	3.42	3.42	U	3.42	1.39	J	3.42	2.09	J	3.42
4	Duplicate of J1PXK0	J1PXK2	8/15/12	3.43	U	3.43	3.43	U	3.43	1.19	J	3.43	3.43	U	3.43	3.43	U	3.43	1.24	J	3.43
5	A-1	J1PXJ0	8/15/12	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51
6	A-2	J1PXJ1	8/15/12	5.84		3.33	5.76		3.33	11.5		3.33	6.52		3.33	8.94		3.33	9.94		3.33
7	A-3	J1PXJ2	8/15/12	58.6		3.34	47.2		3.34	155		3.34	35.3		3.34	119		3.34	132		3.34
8	A-4	J1PXJ3	8/15/12	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27
9	A-5	J1PXJ4	8/15/12	3.34	U	3.34	3.34	U	3.34	10.4		3.34	3.34	U	3.34	1.97	J	3.34	0.970	J	3.34
10	A-6	J1PXJ5	8/15/12	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28
11	A-7	J1PXJ6	8/15/12	7.05		3.45	5.77		3.45	10.1		3.45	3.82		3.45	4.86		3.45	10.1		3.45
12	A-8	J1PXJ7	8/15/12	2.40	J	3.33	2.34	J	3.33	5.24		3.33	3.33	U	3.33	4.71		3.33	5.04		3.33
13	A-9	J1PXJ8	8/15/12	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	1.35	J	3.28	3.28	U	3.28	3.28	U	3.28
14	A-10	J1PXJ9	8/15/12	6.45		3.30	6.45		3.30	14.2		3.3	2.78	J	3.30	12.4		3.30	13.0		3.30
15	A-12	J1PXK1	8/15/12	1.67	J	3.33	1.67	J	3.33	3.10	J	3.33	1.58	J	3.33	3.33	U	3.33	2.85	J	3.33

16 **Statistical Computation Input Data**

	Sample Area	Sample Number	Sample Date	Benzo(b)fluoranthene ug/kg	Benzo(ghi)perylene ug/kg	Fluoranthene ug/kg	Indeno(1,2,3-cd)pyrene ug/kg	Naphthalene ug/kg	Pyrene ug/kg
19	A-11	J1PXK0/ J1PXK2	8/15/12	1.71	1.71	1.56	1.71	1.55	1.67
20	A-1	J1PXJ0	8/15/12	1.76	1.76	1.76	1.76	1.76	1.76
21	A-2	J1PXJ1	8/15/12	5.84	5.76	11.5	6.52	8.94	9.94
22	A-3	J1PXJ2	8/15/12	58.6	47.2	155	35.3	119	132
23	A-4	J1PXJ3	8/15/12	1.64	1.64	1.64	1.64	1.64	1.64
24	A-5	J1PXJ4	8/15/12	1.67	1.67	10.4	1.67	1.97	0.970
25	A-6	J1PXJ5	8/15/12	1.64	1.64	1.64	1.64	1.64	1.64
26	A-7	J1PXJ6	8/15/12	7.05	5.77	10.1	3.82	4.86	10.1
27	A-8	J1PXJ7	8/15/12	2.40	2.34	5.24	1.67	4.71	5.04
28	A-9	J1PXJ8	8/15/12	1.64	1.64	1.64	1.35	1.64	1.64
29	A-10	J1PXJ9	8/15/12	6.45	6.45	14.2	2.78	12.4	13.0
30	A-12	J1PXK1	8/15/12	1.67	1.67	3.10	1.58	1.67	2.85

31 **Statistical Computations**

32		Benzo(b)fluoranthene	Benzo(ghi)perylene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Naphthalene	Pyrene
33	95% UCL based on	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.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.
34	N	12	12	12	12	12	12
35	% < Detection limit	50%	50%	33%	50%	42%	33%
36	Mean	7.67	6.60	18.1	5.12	13.5	15.2
37	Standard deviation	16.2	12.9	43.3	9.62	33.4	37.0
38	95% UCL on mean	15.4	12.7	38.7	9.69	29.3	32.8
39	Maximum value	58.6	47.2	155	35.3	119	132
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (ug/kg)**	15 GW and River Protection	48000 GW Protection	18000 River Protection	330 GW and River Protection	16000 GW Protection	48000 GW Protection
41	**WAC 173-340 3-PART TEST**						
42	95% UCL > Cleanup Limit?	YES	NO	NO	NO	NO	NO
43	> 10% above Cleanup Limit?	NO	NO	NO	NO	NO	NO
44	Any sample > 2X Cleanup Limit?	YES	NO	NO	NO	NO	NO
45	**WAC 173-340 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.	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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

Acronyms and qualifiers are defined on sheet 3.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 10 of 23

1 **100-D-66 Maximum Calculations**

2 **Verification Data - Excavation**

	Sample Area	Sample Number	Sample Date	Hexavalent Chromium			Mercury			Acenaphthene			Acenaphthylene			Anthracene			Benzo(k)fluoranthene			Chrysene			Dibenz(a,h)anthracene			Phenanthrene		
4				mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	A-11	J1PXK0	8/15/12	0.34	B	0.21	0.0284	U	0.0284	3.42	U	3.42	3.42	U	3.42	3.42	U	3.42	3.42	U	3.42	15.0	U	3.42	3.42	U	3.42	3.42	U	3.42
6	Duplicate of J1PXK0	J1PXK2	8/15/12	0.43	B	0.21	0.0282	U	0.0282	3.43	U	3.43	3.43	U	3.43	3.43	U	3.43	3.43	U	3.43	15.0	U	3.43	3.43	U	3.43	3.43	U	3.43
7	A-1	J1PXJ0	8/15/12	0.21	U	0.21	0.0297	U	0.0297	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51
8	A-2	J1PXJ1	8/15/12	0.20	U	0.20	0.0244	U	0.0244	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	2.60	J	3.33	7.22		3.33	3.33	U	3.33	3.17	J	3.33
9	A-3	J1PXJ2	8/15/12	0.20	U	0.20	0.0260	U	0.0260	3.34	U	3.34	10.9		3.34	10.8		3.34	28.9		3.34	111		3.34	6.74		3.34	46.9		3.34
10	A-4	J1PXJ3	8/15/12	0.20	U	0.20	0.0275	U	0.0275	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27	3.27	U	3.27
11	A-5	J1PXJ4	8/15/12	0.20	U	0.20	0.0268	U	0.0268	3.34	U	3.34	3.34	U	3.34	9.80		3.34	3.34	U	3.34	15.0	U	3.34	3.34	U	3.34	3.34	U	3.34
12	A-6	J1PXJ5	8/15/12	0.20	U	0.20	0.0251	U	0.0251	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28
13	A-7	J1PXJ6	8/15/12	0.26	B	0.21	0.274		0.0300	15.1		3.45	44.5		3.45	3.45	U	3.45	2.90	J	3.45	7.53		3.45	3.45	U	3.45	1.52	J	3.45
14	A-8	J1PXJ7	8/15/12	0.20	U	0.20	0.0383		0.0252	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	1.15	J	3.33	15.0	U	3.33	3.33	U	3.33	1.52	J	3.33
15	A-9	J1PXJ8	8/15/12	0.20	U	0.20	0.0267	U	0.0267	3.28	U	3.28	22.1		3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28
16	A-10	J1PXJ9	8/15/12	0.20	U	0.20	0.0440		0.0257	19.0		3.30	3.30	U	3.30	3.30	U	3.30	2.53	J	3.30	8.12		3.30	3.30	U	3.30	2.41	J	3.30
17	A-12	J1PXK1	8/15/12	0.20	U	0.20	0.0274	U	0.0274	2.51	J	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	15.0	U	3.33	3.33	U	3.33	3.33	U	3.33

18 **Statistical Computations**

19		Hexavalent Chromium	Mercury	Acenaphthene	Acenaphthylene	Anthracene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Phenanthrene
20	% < Detection limit	83%	75%	75%	75%	83%	58%	67%	92%	58%
21	Maximum value	0.43	0.274	19.0	44.5	10.8	28.9	111	6.74	46.9
22	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	2 River Protection	0.33 GW and River Protection	96000 ug/kg GW Protection	96000 ug/kg GW Protection	240000 ug/kg GW Protection	15 ug/kg GW and River Protection	100 ug/kg River Protection	30 ug/kg GW and River Protection	240000 ug/kg GW Protection
23	**3-PART TEST**									
24	Maximum > Cleanup Limit?	NO	NA	NO	NO	NO	YES	YES	NO	NO
25	> 10% above Cleanup Limit?	NO	NA	NO	NO	NO	NO	NO	NO	NO
26	Any sample > 2X Cleanup Limit?	NO	NA	NO	NO	NO	NO	NO	NO	NO
27	**3-Part Test Compliance?**	The data set meets the 3-part test criteria when compared to the most stringent RAG.	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.	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.	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.	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.

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 11 of 23

100-D-66 Statistical Calculations

Verification Data - Waste Staging Area Footprints

Sample Area	Sample Number	Sample Date	Carbon-14 pCi/g	Q	MDA	Cesium-137 pCi/g	Q	MDA	Cobalt-60 pCi/g	Q	MDA	Europium-152 pCi/g	Q	MDA	Europium-154 pCi/g	Q	MDA	Nickel-63 pCi/g	Q	MDA	Total beta radiostrontium pCi/g	Q	MDA	Uranium-233/234 pCi/g	Q	MDA	Uranium-238 (AEA) pCi/g	Q	MDA
B-8	J1PXL0	8/16/12	1.00		0.872	0.007	U	0.007	0.007	U	0.007	0.021	U	0.021	0.026	U	0.026	-0.359	U	2.97	0.021	U	0.243	0.530		0.270	0.495		0.270
Duplicate of J1PXL0	J1PXL5	8/16/12	0.131	U	0.827	0.021	U	0.021	0.024	U	0.024	0.056	U	0.056	0.083	U	0.083	1.30	U	3.12	0.392		0.229	0.561		0.195	0.536		0.195
B-1	J1PXK3	8/16/12	0.368	U	0.906	0.020	U	0.020	0.018	U	0.018	0.056	U	0.056	0.071	U	0.071	-0.159	U	2.97	0.150	U	0.260	0.614		0.214	0.642		0.214
B-2	J1PXK4	8/16/12	1.04		0.900	0.048	U	0.048	0.045	U	0.045	0.124	U	0.124	0.170	U	0.170	0.197	U	2.93	0.029	U	0.250	0.647		0.381	0.647		0.381
B-3	J1PXK5	8/16/12	1.03		0.938	0.160		0.021	0.041	U	0.041	0.442		0.061	0.080	U	0.080	1.88	U	2.98	-0.082	U	0.263	0.303		0.257	0.538		0.257
B-4	J1PXK6	8/16/12	1.26		0.886	0.021	U	0.021	0.021	U	0.021	0.048	U	0.048	0.071	U	0.071	-0.250	U	3.10	-0.020	U	0.259	0.457		0.184	0.337		0.184
B-5	J1PXK7	8/16/12	1.05		0.896	0.016		0.005	0.006	U	0.006	0.018	U	0.018	0.021	U	0.021	-0.245	U	3.05	0.046	U	0.260	0.128	U	0.244	0.606		0.244
B-6	J1PXK8	8/16/12	1.33		0.841	0.141		0.036	0.031	U	0.031	0.108		0.067	0.102	U	0.102	0.285	U	3.04	-0.018	U	0.233	0.578		0.276	0.325		0.276
B-7	J1PXK9	8/16/12	0.952		0.931	0.336		0.016	0.014	U	0.014	0.213		0.04	0.048	U	0.048	1.04	U	3.11	0.009	U	0.239	0.421		0.322	0.631		0.322
B-9	J1PXL1	8/16/12	0.211	U	0.886	0.403		0.010	0.033		0.008	0.480		0.023	0.033		0.026	3.31		3.16	0.220	U	0.249	0.698		0.267	0.732		0.267
B-10	J1PXL2	8/16/12	0.326	U	0.927	0.037		0.013	0.010	U	0.010	0.030	U	0.030	0.033	U	0.033	0.779	U	3.23	0.091	U	0.270	0.440		0.211	0.716		0.211
B-11	J1PXL3	8/16/12	4.12		0.877	0.037		0.007	0.008	U	0.008	0.029		0.021	0.028	U	0.028	-0.738	U	3.06	-0.008	U	0.262	0.513		0.231	0.332		0.231
B-12	J1PXL4	8/16/12	0.287	U	0.900	0.698		0.040	0.032	U	0.032	0.340		0.102	0.100	U	0.100	0.759	U	3.15	0.111	U	0.234	0.505		0.176	0.413		0.176

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Carbon-14 pCi/g	Cesium-137 pCi/g	Cobalt-60 pCi/g	Europium-152 pCi/g	Europium-154 pCi/g	Nickel-63 pCi/g	Total beta radiostrontium pCi/g	Uranium-233/234 pCi/g	Uranium-238 (AEA) pCi/g
B-8	J1PXL0/ J1PXL5	8/16/12	0.566	0.007	0.008	0.019	0.027	0.471	0.257	0.546	0.516
B-1	J1PXK3	8/16/12	0.368	0.010	0.009	0.028	0.036	-0.159	0.130	0.614	0.642
B-2	J1PXK4	8/16/12	1.04	0.024	0.023	0.062	0.085	0.197	0.125	0.647	0.647
B-3	J1PXK5	8/16/12	1.03	0.160	0.021	0.442	0.040	1.88	0.132	0.303	0.538
B-4	J1PXK6	8/16/12	1.26	0.011	0.011	0.024	0.036	-0.250	0.130	0.457	0.337
B-5	J1PXK7	8/16/12	1.05	0.016	0.003	0.009	0.011	-0.245	0.130	0.122	0.606
B-6	J1PXK8	8/16/12	1.33	0.141	0.016	0.108	0.051	0.285	0.117	0.578	0.325
B-7	J1PXK9	8/16/12	0.952	0.336	0.007	0.213	0.024	1.04	0.120	0.421	0.631
B-9	J1PXL1	8/16/12	0.211	0.403	0.033	0.480	0.033	3.31	0.125	0.698	0.732
B-10	J1PXL2	8/16/12	0.326	0.037	0.005	0.015	0.017	0.779	0.135	0.440	0.716
B-11	J1PXL3	8/16/12	4.12	0.037	0.004	0.029	0.014	-0.738	0.131	0.513	0.332
B-12	J1PXL4	8/16/12	0.287	0.698	0.016	0.340	0.050	0.759	0.117	0.505	0.413

Statistical Computations

	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Europium-154	Nickel-63	Total beta	Uranium-233/234	Uranium-238 (AEA)
95% UCL based on	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.	Radionuclide data set. Use nonparametric z-statistic.
N	12	12	12	12	12	12	12	12	12
% < Detection limit	33%	33%	92%	50%	92%	92%	92%	8%	0%
Mean	1.04	0.157	0.013	0.147	0.035	0.611	0.137	0.487	0.536
Standard deviation	1.05	0.217	0.009	0.177	0.020	1.10	0.038	0.158	0.151
Z-statistic	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
95% UCL on mean	1.54	0.260	0.017	0.231	0.045	1.13	0.155	0.562	0.608
Maximum value	4.12	0.698	0.045	0.480	0.170	3.31	0.392	0.698	0.732

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 12 of 23

100-D-66 Statistical Calculations

Verification Data - Waste Staging Area Footprints

	Sample Area	Sample Number	Sample Date	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL
3	B-8	J1PXL0	8/16/12	2.77		0.920	69.7		0.460	0.227		0.184	1.73	B	1.84	0.0773	B	0.184
4	Duplicate of J1PXL0	J1PXL5	8/16/12	2.70		0.972	49.1		0.486	0.200		0.194	0.758	B	1.94	0.0811	B	0.194
5	B-1	J1PXK3	8/16/12	3.73		0.850	59.2		0.425	0.226		0.170	1.12	B	1.70	0.0807	B	0.170
6	B-2	J1PXK4	8/16/12	2.55		0.940	49.3		0.470	0.191		0.188	0.809	B	1.88	0.0675	B	0.188
7	B-3	J1PXK5	8/16/12	2.76		0.946	60.8		0.473	0.203		0.189	0.871	B	1.89	0.0923	B	0.189
8	B-4	J1PXK6	8/16/12	2.64		0.927	48.8		0.464	0.193		0.185	0.726	B	1.85	0.0664	B	0.185
9	B-5	J1PXK7	8/16/12	2.80		0.967	47.8		0.483	0.202		0.193	0.722	B	1.93	0.0749	B	0.193
10	B-6	J1PXK8	8/16/12	2.14		0.852	51.5		0.426	0.206		0.170	0.752	B	1.70	0.0980	B	0.170
11	B-7	J1PXK9	8/16/12	2.28		0.936	55.8		0.468	0.251		0.187	0.955	B	1.87	0.0705	B	0.187
12	B-9	J1PXL1	8/16/12	4.10		0.987	71.9		0.494	0.303		0.197	1.41	B	1.97	0.102	B	0.197
13	B-10	J1PXL2	8/16/12	2.41		0.964	61.0		0.482	0.260		0.193	1.31	B	1.93	0.0673	B	0.193
14	B-11	J1PXL3	8/16/12	2.30		0.851	53.6		0.426	0.233		0.170	1.24	B	1.70	0.0666	B	0.170
15	B-12	J1PXL4	8/16/12	2.64		0.974	68.0		0.487	0.316		0.195	0.910	B	1.95	0.0743	B	0.195

	Sample Area	Sample Number	Sample Date	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Lead mg/kg	Q	PQL	Manganese mg/kg	Q	PQL
3	B-8	J1PXL0	8/16/12	10.6		0.184	4.28		1.84	11.6		0.920	2.69		0.460	221		4.60
4	Duplicate of J1PXL0	J1PXL5	8/16/12	11.3		0.194	4.45		1.94	10.4		0.972	2.78		0.486	227		4.86
5	B-1	J1PXK3	8/16/12	15.2		0.170	5.62		1.70	12.9		0.850	3.35		0.425	265		4.25
6	B-2	J1PXK4	8/16/12	11.3		0.188	4.90		1.88	10.6		0.940	2.54		0.470	252		4.70
7	B-3	J1PXK5	8/16/12	10.8		0.189	4.95		1.89	11.0		0.946	2.82		0.473	232		4.73
8	B-4	J1PXK6	8/16/12	10.1		0.185	4.87		1.85	11.6		0.927	2.51		0.464	232		4.64
9	B-5	J1PXK7	8/16/12	11.4		0.193	4.71		1.93	9.86		0.967	2.63		0.483	228		4.83
10	B-6	J1PXK8	8/16/12	10.7		0.170	5.72		1.70	12.5		0.852	2.51		0.426	268		4.26
11	B-7	J1PXK9	8/16/12	12.7		0.187	5.29		1.87	12.0		0.936	3.12		0.468	239		4.68
12	B-9	J1PXL1	8/16/12	11.8		0.197	6.45		1.97	14.2		0.987	4.02		0.494	290		4.94
13	B-10	J1PXL2	8/16/12	8.54		0.193	6.98		1.93	15.3		0.964	3.28		0.482	295		4.82
14	B-11	J1PXL3	8/16/12	9.42		0.170	5.85		1.70	13.5		0.851	2.82		0.426	256		4.26
15	B-12	J1PXL4	8/16/12	14.5		0.195	5.26		1.95	12.9		0.974	3.64		0.487	249		4.87

Statistical Computation Input Data

	Sample Area	Sample Number	Sample Date	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Boron mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Manganese mg/kg
19	B-8	J1PXL0/ J1PXL5	8/16/12	2.74	59.4	0.214	1.24	0.0792	11.0	4.37	11.0	2.74	224
20	B-1	J1PXK3	8/16/12	3.73	59.2	0.226	1.12	0.0807	15.2	5.62	12.9	3.35	265
21	B-2	J1PXK4	8/16/12	2.55	49.3	0.191	0.809	0.0675	11.3	4.90	10.6	2.54	252
22	B-3	J1PXK5	8/16/12	2.76	60.8	0.203	0.871	0.0923	10.8	4.95	11.0	2.82	232
23	B-4	J1PXK6	8/16/12	2.64	48.8	0.193	0.726	0.0664	10.1	4.87	11.6	2.51	232
24	B-5	J1PXK7	8/16/12	2.80	47.8	0.202	0.722	0.0749	11.4	4.71	9.86	2.63	228
25	B-6	J1PXK8	8/16/12	2.14	51.5	0.206	0.752	0.0980	10.7	5.72	12.5	2.51	268
26	B-7	J1PXK9	8/16/12	2.28	55.8	0.251	0.955	0.0705	12.7	5.29	12.0	3.12	239
27	B-9	J1PXL1	8/16/12	4.10	71.9	0.303	1.41	0.102	11.8	6.45	14.2	4.02	290
28	B-10	J1PXL2	8/16/12	2.41	61.0	0.260	1.31	0.0673	8.54	6.98	15.3	3.28	295
29	B-11	J1PXL3	8/16/12	2.30	53.6	0.233	1.24	0.0666	9.42	5.85	13.5	2.82	256
30	B-12	J1PXL4	8/16/12	2.64	68.0	0.316	0.910	0.0743	14.5	5.26	12.9	3.64	249

Statistical Computations

		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
33	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.	Large data set (n ≥10), use MTCAStat lognormal distribution.
34	N	12	12	12	12	12	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
36	Mean	2.76	57.3	0.233	1.01	0.0783	11.5	5.41	12.3	3.00	253
37	Standard deviation	0.585	7.61	0.0418	0.247	0.0126	1.92	0.755	1.58	0.489	23.5
38	95% UCL on mean	3.04	61.5	0.256	1.16	0.0840	12.5	5.83	13.2	3.27	265
39	Maximum value	4.10	71.9	0.316	1.73	0.102	15.2	6.98	15.3	4.02	295
40	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)	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	10.2 GW & River Protection	512 GW & River Protection
41	WAC 173-340 3-PART TEST										
42	95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA	NA
43	> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA	NA
44	Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA	NA
45	WAC 173-340 Compliance?	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.	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.

Acronyms and qualifiers are defined on sheet 3.

Washington Closure Hanford

CALCULATION SHEET

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 13 of 23

100-D-66 Statistical Calculations

Verification Data - Waste Staging Area Footprints

#	Sample Area	Sample Number	Sample Date	Molybdenum			Nickel			Vanadium			Zinc			Chloride		
2				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
3	B-8	J1PXL0	8/16/12	0.286	B	1.84	9.41		3.68	36.2		2.30	30.1		9.20	4.1	B	1.0
4	Duplicate of J1PXL0	J1PXL5	8/16/12	0.233	B	1.94	9.78		3.89	35.9		2.43	29.7		9.72	1.0	B	1.0
5	B-1	J1PXK3	8/16/12	0.355	B	1.70	14.2		3.40	42.2		2.12	34.7		8.50	9.3		0.9
6	B-2	J1PXK4	8/16/12	0.345	B	1.88	9.86		3.76	40.3		2.35	32.0		9.40	1.8	B	0.9
7	B-3	J1PXK5	8/16/12	0.317	B	1.89	8.79		3.79	43.4		2.37	33.8		9.46	1.3	B	1.0
8	B-4	J1PXK6	8/16/12	0.473	B	1.85	9.40		3.71	39.7		2.32	30.6		9.27	2.1	B	1.0
9	B-5	J1PXK7	8/16/12	0.347	B	1.93	9.51		3.87	39.6		2.42	30.6		9.67	2.5	B	1.0
10	B-6	J1PXK8	8/16/12	0.338	B	1.70	9.44		3.41	48.6		2.13	35.1		8.52	1.1	B	1.0
11	B-7	J1PXK9	8/16/12	0.298	B	1.87	9.18		3.74	42.3		2.34	33.8		9.36	2.0	B	1.0
12	B-9	J1PXL1	8/16/12	0.345	B	1.97	10.5		3.95	52.5		2.47	43.5		9.87	3.2	B	1.0
13	B-10	J1PXL2	8/16/12	0.368	B	1.93	9.03		3.86	56.9		2.41	43.1		9.64	8.7		1.0
14	B-11	J1PXL3	8/16/12	0.329	B	1.70	8.97		3.40	55.1		2.13	37.9		8.51	8.7		1.0
15	B-12	J1PXL4	8/16/12	0.310	B	1.95	9.36		3.90	38.5		2.44	36.4		9.74	7.2		1.0

#	Sample Area	Sample Number	Sample Date	Nitrogen in Nitrate [a]			Nitrogen in Nitrite and Nitrate			Sulfate			Benzo(a)anthracene			Benzo(b)fluoranthene		
2				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
3	B-8	J1PXL0	8/16/12	1.8		0.2	1.28		0.10	6.5		1.0	3.33	U	3.33	3.33	U	3.33
4	Duplicate of J1PXL0	J1PXL5	8/16/12	1.2		0.2	0.97		0.10	4.1	B	1.0	3.16	U	3.16	3.16	U	3.16
5	B-1	J1PXK3	8/16/12	12.2		0.2	12.2	D	0.50	89.1		0.9	3.28	U	3.28	3.28	U	3.28
6	B-2	J1PXK4	8/16/12	2.6		0.2	13.4	D	0.20	27.0		0.9	3.29	U	3.29	3.29	U	3.29
7	B-3	J1PXK5	8/16/12	1.1		0.2	1.01		0.10	13.0		1.0	5.00	JD	6.49	4.81	JD	6.49
8	B-4	J1PXK6	8/16/12	2.4		0.2	2.06		0.10	38.4		1.0	1.01	J	3.26	3.26	U	3.26
9	B-5	J1PXK7	8/16/12	1.6		0.2	1.91		0.10	60.4		1.0	3.32	U	3.32	3.32	U	3.32
10	B-6	J1PXK8	8/16/12	3.2		0.2	3.12		0.09	9.6		1.0	3.47		3.30	2.66	J	3.3
11	B-7	J1PXK9	8/16/12	4.4		0.2	4.17		0.10	15.5		1.0	1.04	J	3.29	3.29	U	3.29
12	B-9	J1PXL1	8/16/12	11.6		0.2	11.1	D	0.19	25.7		1.0	1.40	J	3.33	1.02	J	3.33
13	B-10	J1PXL2	8/16/12	7.9		0.2	7.05		0.10	33.9		1.0	14.5		3.32	10.4		3.32
14	B-11	J1PXL3	8/16/12	14.2		0.2	14.0	D	0.47	36.2		1.0	8.22		3.33	6.42		3.33
15	B-12	J1PXL4	8/16/12	9.9		0.2	8.69		0.10	35.1		1.0	5.61		3.34	5.31		3.34

16 **Statistical Computation Input Data**

#	Sample Area	Sample Number	Sample Date	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg	Zinc mg/kg	Chloride mg/kg	Nitrogen in Nitrate [a] mg/kg	Nitrogen in Nitrite and Nitrate mg/kg	Sulfate mg/kg	Benzo(a)anthracene ug/kg	Benzo(b)fluoranthene ug/kg
19	B-8	J1PXL0/ J1PXL5	8/16/12	0.260	9.60	36.1	29.9	2.6	1.5	1.13	5.3	1.62	1.62
20	B-1	J1PXK3	8/16/12	0.355	14.2	42.2	34.7	9.3	12.2	12.2	89.1	1.64	1.64
21	B-2	J1PXK4	8/16/12	0.345	9.86	40.3	32.0	1.8	2.6	13.4	27.0	1.65	1.65
22	B-3	J1PXK5	8/16/12	0.317	8.79	43.4	33.8	1.3	1.1	1.01	13.0	5.00	4.81
23	B-4	J1PXK6	8/16/12	0.473	9.40	39.7	30.6	2.1	2.4	2.06	38.4	1.01	1.63
24	B-5	J1PXK7	8/16/12	0.347	9.51	39.6	30.6	2.5	1.6	1.91	60.4	1.66	1.66
25	B-6	J1PXK8	8/16/12	0.338	9.44	48.6	35.1	1.1	3.2	3.12	9.6	3.47	2.66
26	B-7	J1PXK9	8/16/12	0.298	9.18	42.3	33.8	2.0	4.4	4.17	15.5	1.04	1.65
27	B-9	J1PXL1	8/16/12	0.345	10.5	52.5	43.5	3.2	11.6	11.1	25.7	1.40	1.02
28	B-10	J1PXL2	8/16/12	0.368	9.03	56.9	43.1	8.7	7.9	7.05	33.9	14.5	10.4
29	B-11	J1PXL3	8/16/12	0.329	8.97	55.1	37.9	8.7	14.2	14.0	36.2	8.22	6.42
30	B-12	J1PXL4	8/16/12	0.310	9.36	38.5	36.4	7.2	9.9	8.69	35.1	5.61	5.31

31 **Statistical Computations**

#		Molybdenum	Nickel	Vanadium	Zinc	Chloride
33	95% UCL based on	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), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
34	N	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	0%	0%
36	Mean	0.340	9.82	44.6	35.1	4.2
37	Standard deviation	0.0510	1.45	6.94	4.52	3.2
38	95% UCL on mean	0.365	10.5	48.4	37.6	7.8
39	Maximum value	0.473	14.2	56.9	43.5	9.3
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	8 GW Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	25000 GW Protection
41	**WAC 173-340 3-PART TEST**					
42	95% UCL > Cleanup Limit?	NO	NA	NA	NA	NA
43	> 10% above Cleanup Limit?	NO	NA	NA	NA	NA
44	Any sample > 2X Cleanup Limit?	NO	NA	NA	NA	NA
45	**WAC 173-340 Compliance?**	The data set meets the 3-part test criteria when compared to the most stringent RAG.	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.	Because all values are below background (100 mg/kg) the WAC 173-340 3-part test is not required.

#		Nitrogen in Nitrate [a]	Nitrogen in Nitrite and Nitrate	Sulfate	Benzo(a)anthracene	Benzo(b)fluoranthene
33	95% UCL based on	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), lognormal and normal distribution rejected, use z-statistic.
34	N	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	33%	50%
36	Mean	6.1	6.65	32.4	3.90	3.37
37	Standard deviation	4.8	5.04	23.5	4.03	2.84
38	95% UCL on mean	13.9	17.4	63.4	5.81	4.72
39	Maximum value	14.2	14.0	89.1	14.5	10.4
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	1000 GW Protection	1000 GW Protection	25000 GW Protection	15 ug/kg GW and River Protection	15 ug/kg GW and River Protection
41	**WAC 173-340 3-PART TEST**					
42	95% UCL > Cleanup Limit?	NO	NO	NA	NO	NO
43	> 10% above Cleanup Limit?	NO	NO	NA	NO	NO
44	Any sample > 2X Cleanup Limit?	NO	NO	NA	NO	NO
45	**WAC 173-340 Compliance?**	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.	Because all values are below background (237 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.

Acronyms and qualifiers are defined on sheet 3.

[a] Nitrate has been converted to nitrogen in nitrate

Washington Closure Hanford

CALCULATION SHEET

Originator J. D. Skoglie **Date** 10/02/12 **Calc. No.** 0100D-CA-V0479 **Rev. No.** 0
Project 100-D Field Remediation **Job No.** 14655 **Checked** N. K. Schiffern **Date** 10/02/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 14 of 23

100-D-66 Statistical Calculations
Verification Data - Waste Staging Area Footprints

	Sample	Sample	Sample	Benzo(ghi)perylene			Chrysene			Fluoranthene			Indeno(1,2,3-cd)pyrene			Pyrene		
2	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
3	B-8	J1PXL0	8/16/12	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33
4	Duplicate of J1PXL0	J1PXL5	8/16/12	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16
5	B-1	J1PXK3	8/16/12	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28
6	B-2	J1PXK4	8/16/12	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29
7	B-3	J1PXK5	8/16/12	4.06	JD	6.49	5.44	JD	6.49	16.7	D	6.49	2.53	JD	6.49	8.95	D	6.49
8	B-4	J1PXK6	8/16/12	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26
9	B-5	J1PXK7	8/16/12	3.32	U	3.32	0.863	J	3.32	3.32	U	3.32	3.32	U	3.32	3.32	U	3.32
10	B-6	J1PXK8	8/16/12	2.81	J	3.30	3.50		3.30	5.02		3.30	1.72	J	3.30	4.67		3.30
11	B-7	J1PXK9	8/16/12	3.29	U	3.29	0.973	J	3.29	1.47	J	3.29	1.52	J	3.29	1.04	J	3.29
12	B-9	J1PXL1	8/16/12	0.884	J	3.33	1.40	J	3.33	1.17	J	3.33	3.33	U	3.33	1.57	J	3.33
13	B-10	J1PXL2	8/16/12	8.18		3.32	11.9		3.32	20.4		3.32	6.94		3.32	17.9		3.32
14	B-11	J1PXL3	8/16/12	5.84		3.33	6.26		3.33	12.4		3.33	6.18		3.33	9.97		3.33
15	B-12	J1PXL4	8/16/12	3.34		3.34	6.28		3.34	9.78		3.34	3.82		3.34	8.43		3.34

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Benzo(ghi)perylene	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Pyrene
18	Area	Number	Date	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
19	B-8	J1PXL0/ J1PXL5	8/16/12	1.62	1.62	1.62	1.62	1.62
20	B-1	J1PXK3	8/16/12	1.64	1.64	1.64	1.64	1.64
21	B-2	J1PXK4	8/16/12	1.65	1.65	1.65	1.65	1.65
22	B-3	J1PXK5	8/16/12	4.06	5.44	16.7	2.53	8.95
23	B-4	J1PXK6	8/16/12	1.63	1.63	1.63	1.63	1.63
24	B-5	J1PXK7	8/16/12	1.66	0.863	1.66	1.66	1.66
25	B-6	J1PXK8	8/16/12	2.81	3.50	5.02	1.72	4.67
26	B-7	J1PXK9	8/16/12	1.65	0.973	1.47	1.52	1.04
27	B-9	J1PXL1	8/16/12	0.884	1.40	1.17	1.67	1.57
28	B-10	J1PXL2	8/16/12	8.18	11.9	20.4	6.94	17.9
29	B-11	J1PXL3	8/16/12	5.84	6.26	12.4	6.18	9.97
30	B-12	J1PXL4	8/16/12	3.34	6.28	9.78	3.82	8.43

31 **Statistical Computations**

32		Benzo(ghi)perylene	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Pyrene
33	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), 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.
34	N	12	12	12	12	12
35	% < Detection limit	50%	33%	42%	50%	42%
36	Mean	2.91	3.60	6.26	2.71	5.06
37	Standard deviation	2.17	3.32	6.85	1.92	5.24
38	95% UCL on mean	3.94	7.20	9.51	3.63	7.55
39	Maximum value	8.18	11.9	20.4	6.94	17.9
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (ug/kg)**	48000 GW Protection	100 River Protection	18000 River Protection	330 GW and River Protection	48000 GW Protection
41	**WAC 173-340 3-PART TEST**					
42	95% UCL > Cleanup Limit?	NO	NO	NO	NO	NO
43	> 10% above Cleanup Limit?	NO	NO	NO	NO	NO
44	Any sample > 2X Cleanup Limit?	NO	NO	NO	NO	NO
45	**WAC 173-340 Compliance?**	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.	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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

Acronyms and qualifiers are defined on sheet 3.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 15 of 23

1 **100-D-66 Maximum Calculations**

2 **Verification Data - Waste Staging Area Footprints**

Row	Sample Area	Sample Number	Sample Date	Antimony			Mercury			Fluoride			Acenaphthene		
4				mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL
5	B-8	J1PXL0	8/16/12	0.552	U	0.552	0.0268	U	0.0268	2.8	B	1.0	3.33	U	3.33
6	Duplicate of J1PXL0	J1PXL5	8/16/12	0.583	U	0.583	0.0284	U	0.0284	1.0	U	1.0	4.80		3.16
7	B-1	J1PXK3	8/16/12	0.510	U	0.510	0.0282	U	0.0282	0.9	U	0.9	3.28	U	3.28
8	B-2	J1PXK4	8/16/12	0.564	U	0.564	0.0269	U	0.0269	0.9	U	0.9	3.29	U	3.29
9	B-3	J1PXK5	8/16/12	0.568	U	0.568	0.0291	U	0.0291	1.0	U	1.0	6.49	UD	6.49
10	B-4	J1PXK6	8/16/12	0.556	U	0.556	0.0257	U	0.0257	1.0	U	1.0	3.26	U	3.26
11	B-5	J1PXK7	8/16/12	0.353	B	0.580	0.0245	U	0.0245	1.0	U	1.0	3.32	U	3.32
12	B-6	J1PXK8	8/16/12	0.511	U	0.511	0.0283	U	0.0283	1.0	U	1.0	3.30	U	3.30
13	B-7	J1PXK9	8/16/12	0.562	U	0.562	0.0239	U	0.0239	1.0	U	1.0	3.29	U	3.29
14	B-9	J1PXL1	8/16/12	0.592	U	0.592	0.0120	B	0.0245	1.1	B	1.0	11.4		3.33
15	B-10	J1PXL2	8/16/12	0.578	U	0.578	0.0237	U	0.0237	1.0	U	1.0	3.32	U	3.32
16	B-11	J1PXL3	8/16/12	0.511	U	0.511	0.0238	U	0.0238	1.0	U	1.0	3.33	U	3.33
17	B-12	J1PXL4	8/16/12	0.585	U	0.585	0.0175	B	0.0246	1.0	U	1.0	3.34	U	3.34

Row	Sample Number	Acenaphthylene			Benzo(a)pyrene			Benzo(k)fluoranthene			Fluorene			Naphthalene			Phenanthrene		
4		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	J1PXL0	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33
6	J1PXL5	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16	3.16	U	3.16
7	J1PXK3	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28
8	J1PXK4	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29
9	J1PXK5	1320	D	6.49	4.55	JD	6.49	6.49	UD	6.49	9.78	D	6.49	12.6	D	6.49	15.5	D	6.49
10	J1PXK6	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26
11	J1PXK7	3.32	U	3.32	3.32	U	3.32	3.32	U	3.32	3.32	U	3.32	3.32	U	3.32	3.32	U	3.32
12	J1PXK8	3.30	U	3.30	3.30	U	3.30	1.07	J	3.30	3.30	U	3.30	6.00		3.30	0.908	J	3.30
13	J1PXK9	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29	3.29	U	3.29
14	J1PXL1	6.87		3.33	3.33	U	3.33	3.33	U	3.33	6.96		3.33	3.33	U	3.33	3.33	U	3.33
15	J1PXL2	3.32	U	3.32	10.5		3.32	4.51		3.32	3.32	U	3.32	20.3		3.32	4.11		3.32
16	J1PXL3	1.83	J	3.33	4.93		3.33	2.10	J	3.33	3.33	U	3.33	7.27		3.33	3.08	J	3.33
17	J1PXL4	3.34	U	3.34	4.31		3.34	2.00	J	3.34	3.34	U	3.34	6.31		3.34	2.05	J	3.34

18 **Statistical Computations**

Row		Antimony	Mercury	Fluoride	Acenaphthene	Acenaphthylene	Benzo(a)pyrene	Benzo(k)fluoranthene	Fluorene	Naphthalene	Phenanthrene
20	% < Detection limit	92%	83%	83%	83%	75%	67%	67%	83%	58%	58%
21	Maximum value	0.353	0.0175	2.8	11.4	1320	10.5	4.51	9.78	20.3	15.5
22	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	5 GW and River Protection	0.33 GW and River Protection	96 GW Protection	96000 ug/kg GW Protection	96000 ug/kg GW Protection	15 ug/kg GW and River Protection	15 ug/kg GW and River Protection	64000 ug/kg GW Protection	16000 ug/kg River Protection	240000 ug/kg GW Protection
23	**3-PART TEST**										
24	Maximum > Cleanup Limit?	NA	NA	NA	NO	NO	NO	NO	NO	NO	NO
25	> 10% above Cleanup Limit?	NA	NA	NA	NO	NO	NO	NO	NO	NO	NO
26	Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NO	NO	NO	NO	NO	NO
27	**3-Part Test 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 (0.33 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (2.81 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.	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.	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.	The data set meets the 3 part test criteria when compared to the most stringent RAG.

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 16 of 23

Ecology Software (MTCAStat) Results, 100-D-66 Excavation

Arsenic 95% UCL Calculation

DATA	ID
2.53	J1PXK0/ J1PXK2
2.80	J1PXJ0
3.34	J1PXJ1
2.60	J1PXJ2
1.69	J1PXJ3
3.14	J1PXJ4
1.11	J1PXJ5
2.64	J1PXJ6
2.34	J1PXJ7
2.50	J1PXJ8
2.56	J1PXJ9
1.67	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	2.41
Censored		Lognormal mean	2.43
Detection limit or PQL		Std. devn.	0.636
Method detection limit		Median	2.54
TOTAL	12	Min.	1.11
		Max.	3.34

Lognormal distribution? r-squared is: 0.847
Normal distribution? r-squared is: 0.921
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 2.74

Barium 95% UCL Calculation

DATA	ID
63.0	J1PXK0/ J1PXK2
48.3	J1PXJ0
63.5	J1PXJ1
77.7	J1PXJ2
54.7	J1PXJ3
90.0	J1PXJ4
50.6	J1PXJ5
64.7	J1PXJ6
52.0	J1PXJ7
83.9	J1PXJ8
54.2	J1PXJ9
58.3	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	63.4
Censored		Lognormal mean	63.5
Detection limit or PQL		Std. devn.	13.6
Method detection limit		Median	60.7
TOTAL	12	Min.	48.3
		Max.	90.0

Lognormal distribution? r-squared is: 0.932
Normal distribution? r-squared is: 0.897
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 71.1

Beryllium 95% UCL Calculation

DATA	ID
0.288	J1PXK0/ J1PXK2
0.185	J1PXJ0
0.309	J1PXJ1
0.289	J1PXJ2
0.210	J1PXJ3
0.448	J1PXJ4
0.164	J1PXJ5
0.320	J1PXJ6
0.252	J1PXJ7
0.427	J1PXJ8
0.276	J1PXJ9
0.227	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.283
Censored		Lognormal mean	0.284
Detection limit or PQL		Std. devn.	0.0870
Method detection limit		Median	0.282
TOTAL	12	Min.	0.164
		Max.	0.448

Lognormal distribution? r-squared is: 0.975
Normal distribution? r-squared is: 0.937
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.339

Boron 95% UCL Calculation

DATA	ID
0.524	J1PXK0/ J1PXK2
0.763	J1PXJ0
1.55	J1PXJ1
1.41	J1PXJ2
0.547	J1PXJ3
1.70	J1PXJ4
0.715	J1PXJ5
0.752	J1PXJ6
0.660	J1PXJ7
1.13	J1PXJ8
0.720	J1PXJ9
0.575	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.921
Censored		Lognormal mean	0.923
Detection limit or PQL		Std. devn.	0.416
Method detection limit		Median	0.736
TOTAL	12	Min.	0.524
		Max.	1.70

Lognormal distribution? r-squared is: 0.896
Normal distribution? r-squared is: 0.838
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 1.12

Cadmium 95% UCL Calculation

DATA	ID
0.0565	J1PXK0/ J1PXK2
0.0759	J1PXJ0
0.0675	J1PXJ1
0.0669	J1PXJ2
0.0516	J1PXJ3
0.0928	J1PXJ4
0.0481	J1PXJ5
0.164	J1PXJ6
0.0569	J1PXJ7
0.0604	J1PXJ8
0.0646	J1PXJ9
0.0457	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.0709
Censored		Lognormal mean	0.0705
Detection limit or PQL		Std. devn.	0.0320
Method detection limit		Median	0.0625
TOTAL	12	Min.	0.0457
		Max.	0.164

Lognormal distribution? r-squared is: 0.829
Normal distribution? r-squared is: 0.664
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.0860

Chromium 95% UCL Calculation

DATA	ID
19.3	J1PXK0/ J1PXK2
10.8	J1PXJ0
12.0	J1PXJ1
9.62	J1PXJ2
6.27	J1PXJ3
12.7	J1PXJ4
3.63	J1PXJ5
26.0	J1PXJ6
15.7	J1PXJ7
11.0	J1PXJ8
17.1	J1PXJ9
7.10	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	12.6
Censored		Lognormal mean	12.9
Detection limit or PQL		Std. devn.	6.18
Method detection limit		Median	11.5
TOTAL	12	Min.	3.63
		Max.	26.0

Lognormal distribution? r-squared is: 0.967
Normal distribution? r-squared is: 0.956
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 18.4

Cobalt 95% UCL Calculation

DATA	ID
4.35	J1PXK0/ J1PXK2
3.57	J1PXJ0
6.09	J1PXJ1
6.48	J1PXJ2
6.98	J1PXJ3
6.77	J1PXJ4
6.06	J1PXJ5
5.79	J1PXJ6
4.87	J1PXJ7
6.47	J1PXJ8
4.80	J1PXJ9
5.85	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	5.67
Censored		Lognormal mean	5.69
Detection limit or PQL		Std. devn.	1.05
Method detection limit		Median	5.96
TOTAL	12	Min.	3.57
		Max.	6.98

Lognormal distribution? r-squared is: 0.894
Normal distribution? r-squared is: 0.932
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 6.22

Copper 95% UCL Calculation

DATA	ID
10.6	J1PXK0/ J1PXK2
9.79	J1PXJ0
12.1	J1PXJ1
13.3	J1PXJ2
13.6	J1PXJ3
16.9	J1PXJ4
11.1	J1PXJ5
14.2	J1PXJ6
11.6	J1PXJ7
14.6	J1PXJ8
11.2	J1PXJ9
11.9	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	12.6
Censored		Lognormal mean	12.6
Detection limit or PQL		Std. devn.	2.01
Method detection limit		Median	12.0
TOTAL	12	Min.	9.79
		Max.	16.9

Lognormal distribution? r-squared is: 0.973
Normal distribution? r-squared is: 0.947
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13.7

Lead 95% UCL Calculation

DATA	ID
3.99	J1PXK0/ J1PXK2
2.73	J1PXJ0
4.23	J1PXJ1
3.62	J1PXJ2
2.54	J1PXJ3
5.08	J1PXJ4
1.87	J1PXJ5
4.13	J1PXJ6
3.25	J1PXJ7
4.27	J1PXJ8
3.74	J1PXJ9
2.63	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	3.51
Censored		Lognormal mean	3.53
Detection limit or PQL		Std. devn.	0.920
Method detection limit		Median	3.68
TOTAL	12	Min.	1.87
		Max.	5.08

Lognormal distribution? r-squared is: 0.937
Normal distribution? r-squared is: 0.968
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 4.16

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	Date	09/27/12
Project	100-D Field Remediation	Job No.	14655
Subject	100-D-66 Waste Site Upland Portion Cleanup Verification 95% UCL Calculations		
Calc. No.	0100D-CA-V0479	Rev. No.	0
Checked	N. K. Schiffern	Date	09/27/12
		Sheet No.	17 of 23

Ecology Software (MTCAStat) Results, 100-D-66 Excavation

Manganese 95% UCL Calculation

DATA	ID
222	J1PXK0/ J1PXK2
196	J1PXJ0
282	J1PXJ1
286	J1PXJ2
298	J1PXJ3
253	J1PXJ4
247	J1PXJ5
273	J1PXJ6
224	J1PXJ7
245	J1PXJ8
236	J1PXJ9
245	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	251
Censored		Lognormal mean	251
Detection limit or PQL		Std. devn.	29.8
Method detection limit		Median	246
TOTAL	12	Min.	196
		Max.	298

Lognormal distribution? r-squared is: 0.966 — Normal distribution? r-squared is: 0.972

Recommendations: Use lognormal distribution.

UCL (Land's method) is 268

Molybdenum 95% UCL Calculation

DATA	ID
0.514	J1PXK0/ J1PXK2
0.272	J1PXJ0
0.434	J1PXJ1
0.320	J1PXJ2
0.309	J1PXJ3
0.273	J1PXJ4
0.321	J1PXJ5
0.263	J1PXJ6
0.196	J1PXJ7
0.212	J1PXJ8
0.980	J1PXJ9
0.204	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.358
Censored		Lognormal mean	0.355
Detection limit or PQL		Std. devn.	0.217
Method detection limit		Median	0.291
TOTAL	12	Min.	0.196
		Max.	0.980

Lognormal distribution? r-squared is: 0.862 — Normal distribution? r-squared is: 0.672

Recommendations: Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.461

Nickel 95% UCL Calculation

DATA	ID
8.37	J1PXK0/ J1PXK2
8.86	J1PXJ0
10.9	J1PXJ1
12.9	J1PXJ2
8.99	J1PXJ3
11.5	J1PXJ4
7.14	J1PXJ5
11.8	J1PXJ6
9.60	J1PXJ7
9.61	J1PXJ8
10.3	J1PXJ9
8.42	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	9.87
Censored		Lognormal mean	9.88
Detection limit or PQL		Std. devn.	1.67
Method detection limit		Median	9.61
TOTAL	12	Min.	7.14
		Max.	12.9

Lognormal distribution? r-squared is: 0.983 — Normal distribution? r-squared is: 0.979

Recommendations: Use lognormal distribution.

UCL (Land's method) is 10.8

Vanadium 95% UCL Calculation

DATA	ID
28.6	J1PXK0/ J1PXK2
26.8	J1PXJ0
38.3	J1PXJ1
49.8	J1PXJ2
62.8	J1PXJ3
47.3	J1PXJ4
60.6	J1PXJ5
43.5	J1PXJ6
33.1	J1PXJ7
47.9	J1PXJ8
31.4	J1PXJ9
44.0	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	42.8
Censored		Lognormal mean	43.0
Detection limit or PQL		Std. devn.	11.7
Method detection limit		Median	43.8
TOTAL	12	Min.	26.8
		Max.	62.8

Lognormal distribution? r-squared is: 0.967 — Normal distribution? r-squared is: 0.960

Recommendations: Use lognormal distribution.

UCL (Land's method) is 50.5

Zinc 95% UCL Calculation

DATA	ID
31.0	J1PXK0/ J1PXK2
25.5	J1PXJ0
36.0	J1PXJ1
39.6	J1PXJ2
42.5	J1PXJ3
45.0	J1PXJ4
39.0	J1PXJ5
42.3	J1PXJ6
32.3	J1PXJ7
42.9	J1PXJ8
32.4	J1PXJ9
34.9	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	37.0
Censored		Lognormal mean	37.0
Detection limit or PQL		Std. devn.	5.91
Method detection limit		Median	37.5
TOTAL	12	Min.	25.5
		Max.	45.0

Lognormal distribution? r-squared is: 0.935 — Normal distribution? r-squared is: 0.957

Recommendations: Use lognormal distribution.

UCL (Land's method) is 40.6

Chloride 95% UCL Calculation

DATA	ID
2.1	J1PXK0/ J1PXK2
1.0	J1PXJ0
4.9	J1PXJ1
127	J1PXJ2
5.7	J1PXJ3
1.1	J1PXJ4
8.1	J1PXJ5
48.7	J1PXJ6
0.9	J1PXJ7
1.1	J1PXJ8
1.4	J1PXJ9
14.3	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	18.0
Censored		Lognormal mean	17.0
Detection limit or PQL		Std. devn.	36.9
Method detection limit		Median	3.5
TOTAL	12	Min.	0.9
		Max.	127

Lognormal distribution? r-squared is: 0.888 — Normal distribution? r-squared is: 0.513

Recommendations: Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 35.5

Nitrogen in Nitrate 95% UCL Calculation

DATA	ID
0.4	J1PXK0/ J1PXK2
0.2	J1PXJ0
3.6	J1PXJ1
7.3	J1PXJ2
0.8	J1PXJ3
5.8	J1PXJ4
1.9	J1PXJ5
25.3	J1PXJ6
4.1	J1PXJ7
0.9	J1PXJ8
1.4	J1PXJ9
10.4	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	5.2
Censored		Lognormal mean	6.4
Detection limit or PQL		Std. devn.	7.1
Method detection limit		Median	2.8
TOTAL	12	Min.	0.2
		Max.	25.3

Lognormal distribution? r-squared is: 0.991 — Normal distribution? r-squared is: 0.683

Recommendations: Use lognormal distribution.

UCL (Land's method) is 31.2

Nitrogen in Nitrate and Nitrite 95% UCL Calculation

DATA	ID
0.43	J1PXK0/ J1PXK2
0.40	J1PXJ0
3.53	J1PXJ1
7.18	J1PXJ2
0.86	J1PXJ3
5.58	J1PXJ4
1.90	J1PXJ5
25.0	J1PXJ6
3.97	J1PXJ7
0.84	J1PXJ8
1.28	J1PXJ9
9.91	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	5.07
Censored		Lognormal mean	5.66
Detection limit or PQL		Std. devn.	6.96
Method detection limit		Median	2.72
TOTAL	12	Min.	0.40
		Max.	25.0

Lognormal distribution? r-squared is: 0.974 — Normal distribution? r-squared is: 0.670

Recommendations: Use lognormal distribution.

UCL (Land's method) is 22.3

Sulfate 95% UCL Calculation

DATA	ID
14.5	J1PXK0/ J1PXK2
9.3	J1PXJ0
21.5	J1PXJ1
937	J1PXJ2
10.3	J1PXJ3
25.2	J1PXJ4
210	J1PXJ5
185	J1PXJ6
26.6	J1PXJ7
7.3	J1PXJ8
16.2	J1PXJ9
204	J1PXK1

Number of samples		Uncensored values	
Uncensored	12	Mean	139
Censored		Lognormal mean	138
Detection limit or PQL		Std. devn.	264
Method detection limit		Median	23.4
TOTAL	12	Min.	7.3
		Max.	937

Lognormal distribution? r-squared is: 0.874 — Normal distribution? r-squared is: 0.523

Recommendations: Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 264

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

Rev. No. 0
Date 10/02/12
Sheet No. 18 of 23

Ecology Software (MTCAStat) Results, 100-D-66 Excavation

Benzo(a)anthracene 95% UCL Calculation

DATA	ID				
1.56	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
9.71	J1PXJ1	Number of samples		Uncensored values	
113	J1PXJ2	Uncensored	12	Mean	13.4
1.64	J1PXJ3	Censored		Lognormal mean	9.68
3.16	J1PXJ4	Detection limit or PQL		Std. devn.	31.5
1.64	J1PXJ5	Method detection limit		Median	3.21
9.31	J1PXJ6	TOTAL	12	Min.	1.56
4.42	J1PXJ7			Max.	113
1.64	J1PXJ8				
9.42	J1PXJ9				
3.25	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.785 r-squared is: 0.379
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 28.4

Benzo(a)pyrene 95% UCL Calculation

DATA	ID				
1.50	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
6.19	J1PXJ1	Number of samples		Uncensored values	
69.5	J1PXJ2	Uncensored	12	Mean	8.23
1.64	J1PXJ3	Censored		Lognormal mean	5.69
1.09	J1PXJ4	Detection limit or PQL		Std. devn.	19.4
1.64	J1PXJ5	Method detection limit		Median	1.84
5.91	J1PXJ6	TOTAL	12	Min.	1.09
2.17	J1PXJ7			Max.	69.5
1.64	J1PXJ8				
3.87	J1PXJ9				
1.92	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.710 r-squared is: 0.364
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 17.4

Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID				
1.71	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
5.84	J1PXJ1	Number of samples		Uncensored values	
58.6	J1PXJ2	Uncensored	12	Mean	7.67
1.64	J1PXJ3	Censored		Lognormal mean	5.85
1.67	J1PXJ4	Detection limit or PQL		Std. devn.	16.2
1.64	J1PXJ5	Method detection limit		Median	1.73
7.05	J1PXJ6	TOTAL	12	Min.	1.64
2.40	J1PXJ7			Max.	58.6
1.64	J1PXJ8				
6.45	J1PXJ9				
1.67	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.683 r-squared is: 0.391
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 15.4

Benzo(ghi)perylene 95% UCL Calculation

DATA	ID				
1.71	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
5.76	J1PXJ1	Number of samples		Uncensored values	
47.2	J1PXJ2	Uncensored	12	Mean	6.60
1.64	J1PXJ3	Censored		Lognormal mean	5.26
1.67	J1PXJ4	Detection limit or PQL		Std. devn.	12.9
1.64	J1PXJ5	Method detection limit		Median	1.73
5.77	J1PXJ6	TOTAL	12	Min.	1.64
2.34	J1PXJ7			Max.	47.2
1.64	J1PXJ8				
6.45	J1PXJ9				
1.67	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.683 r-squared is: 0.403
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 12.7

Fluoranthene 95% UCL Calculation

DATA	ID				
1.56	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
11.5	J1PXJ1	Number of samples		Uncensored values	
155	J1PXJ2	Uncensored	12	Mean	18.1
1.64	J1PXJ3	Censored		Lognormal mean	13.8
10.4	J1PXJ4	Detection limit or PQL		Std. devn.	43.3
1.64	J1PXJ5	Method detection limit		Median	4.17
10.1	J1PXJ6	TOTAL	12	Min.	1.56
5.24	J1PXJ7			Max.	155
1.64	J1PXJ8				
14.2	J1PXJ9				
3.10	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.824 r-squared is: 0.385
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 38.7

Indeno(1,2,3-cd)pyrene 95% UCL Calculation

DATA	ID				
1.71	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
6.52	J1PXJ1	Number of samples		Uncensored values	
35.3	J1PXJ2	Uncensored	12	Mean	5.12
1.64	J1PXJ3	Censored		Lognormal mean	4.10
1.67	J1PXJ4	Detection limit or PQL		Std. devn.	9.62
1.64	J1PXJ5	Method detection limit		Median	1.69
3.82	J1PXJ6	TOTAL	12	Min.	1.35
1.67	J1PXJ7			Max.	35.3
1.35	J1PXJ8				
2.78	J1PXJ9				
1.58	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.655 r-squared is: 0.400
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 9.69

Naphthalene 95% UCL Calculation

DATA	ID				
1.55	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
8.94	J1PXJ1	Number of samples		Uncensored values	
119	J1PXJ2	Uncensored	12	Mean	13.5
1.64	J1PXJ3	Censored		Lognormal mean	9.10
1.97	J1PXJ4	Detection limit or PQL		Std. devn.	33.4
1.64	J1PXJ5	Method detection limit		Median	1.86
4.86	J1PXJ6	TOTAL	12	Min.	1.55
4.71	J1PXJ7			Max.	119
1.64	J1PXJ8				
12.4	J1PXJ9				
1.67	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.729 r-squared is: 0.372
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 29.3

Pyrene 95% UCL Calculation

DATA	ID				
1.67	J1PXK0/ J1PXK2				
1.76	J1PXJ0				
9.94	J1PXJ1	Number of samples		Uncensored values	
132	J1PXJ2	Uncensored	12	Mean	15.2
1.64	J1PXJ3	Censored		Lognormal mean	11.1
0.970	J1PXJ4	Detection limit or PQL		Std. devn.	37.0
1.64	J1PXJ5	Method detection limit		Median	2.30
10.1	J1PXJ6	TOTAL	12	Min.	0.970
5.04	J1PXJ7			Max.	132
1.64	J1PXJ8				
13.0	J1PXJ9				
2.85	J1PXK1				

Lognormal distribution? Normal distribution?
r-squared is: 0.822 r-squared is: 0.384
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 32.8

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

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Ecology Software (MTCAStat) Results, 100-D-66 Waste Site Staging Area Footprints

Arsenic 95% UCL Calculation

DATA	ID
2.74	J1PXL0/ J1PXL5
3.73	J1PXK3
2.55	J1PXK4
2.76	J1PXK5
2.64	J1PXK6
2.80	J1PXK7
2.14	J1PXK8
2.28	J1PXK9
4.10	J1PXL1
2.41	J1PXL2
2.30	J1PXL3
2.64	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	2.76
Censored		Lognormal mean	2.76
Detection limit or PQL		Std. devn.	0.585
Method detection limit		Median	2.64
TOTAL	12	Min.	2.14
		Max.	4.10

Lognormal distribution? r-squared is: 0.864
Normal distribution? r-squared is: 0.803
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 3.04

Barium 95% UCL Calculation

DATA	ID
59.4	J1PXL0/ J1PXL5
59.2	J1PXK3
49.3	J1PXK4
60.8	J1PXK5
48.8	J1PXK6
47.8	J1PXK7
51.5	J1PXK8
55.8	J1PXK9
71.9	J1PXL1
61.0	J1PXL2
53.6	J1PXL3
68.0	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	57.3
Censored		Lognormal mean	57.3
Detection limit or PQL		Std. devn.	7.61
Method detection limit		Median	57.5
TOTAL	12	Min.	47.8
		Max.	71.9

Lognormal distribution? r-squared is: 0.959
Normal distribution? r-squared is: 0.947
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 61.5

Beryllium 95% UCL Calculation

DATA	ID
0.214	J1PXL0/ J1PXL5
0.226	J1PXK3
0.191	J1PXK4
0.203	J1PXK5
0.193	J1PXK6
0.202	J1PXK7
0.206	J1PXK8
0.251	J1PXK9
0.303	J1PXL1
0.260	J1PXL2
0.233	J1PXL3
0.316	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	0.233
Censored		Lognormal mean	0.233
Detection limit or PQL		Std. devn.	0.042
Method detection limit		Median	0.220
TOTAL	12	Min.	0.191
		Max.	0.316

Lognormal distribution? r-squared is: 0.910
Normal distribution? r-squared is: 0.878
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.256

Boron 95% UCL Calculation

DATA	ID
1.24	J1PXL0/ J1PXL5
1.12	J1PXK3
0.809	J1PXK4
0.871	J1PXK5
0.726	J1PXK6
0.722	J1PXK7
0.752	J1PXK8
0.955	J1PXK9
1.41	J1PXL1
1.31	J1PXL2
1.24	J1PXL3
0.910	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	1.01
Censored		Lognormal mean	1.01
Detection limit or PQL		Std. devn.	0.247
Method detection limit		Median	0.933
TOTAL	12	Min.	0.722
		Max.	1.41

Lognormal distribution? r-squared is: 0.935
Normal distribution? r-squared is: 0.925
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 1.16

Cadmium 95% UCL Calculation

DATA	ID
0.0792	J1PXL0/ J1PXL5
0.0807	J1PXK3
0.0675	J1PXK4
0.0923	J1PXK5
0.0664	J1PXK6
0.0749	J1PXK7
0.0980	J1PXK8
0.0705	J1PXK9
0.102	J1PXL1
0.0673	J1PXL2
0.0666	J1PXL3
0.0743	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	0.0783
Censored		Lognormal mean	0.0784
Detection limit or PQL		Std. devn.	0.0126
Method detection limit		Median	0.0746
TOTAL	12	Min.	0.0664
		Max.	0.102

Lognormal distribution? r-squared is: 0.891
Normal distribution? r-squared is: 0.870
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.0840

Chromium 95% UCL Calculation

DATA	ID
11.0	J1PXL0/ J1PXL5
15.2	J1PXK3
11.3	J1PXK4
10.8	J1PXK5
10.1	J1PXK6
11.4	J1PXK7
10.7	J1PXK8
12.7	J1PXK9
11.8	J1PXL1
8.54	J1PXL2
9.42	J1PXL3
14.5	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	11.5
Censored		Lognormal mean	11.5
Detection limit or PQL		Std. devn.	1.92
Method detection limit		Median	11.1
TOTAL	12	Min.	8.54
		Max.	15.2

Lognormal distribution? r-squared is: 0.963
Normal distribution? r-squared is: 0.938
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 12.5

Cobalt 95% UCL Calculation

DATA	ID
4.37	J1PXL0/ J1PXL5
5.62	J1PXK3
4.90	J1PXK4
4.95	J1PXK5
4.87	J1PXK6
4.71	J1PXK7
5.72	J1PXK8
5.29	J1PXK9
6.45	J1PXL1
6.98	J1PXL2
5.85	J1PXL3
5.26	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	5.41
Censored		Lognormal mean	5.42
Detection limit or PQL		Std. devn.	0.755
Method detection limit		Median	5.28
TOTAL	12	Min.	4.37
		Max.	6.98

Lognormal distribution? r-squared is: 0.968
Normal distribution? r-squared is: 0.944
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 5.83

Copper 95% UCL Calculation

DATA	ID
11.0	J1PXL0/ J1PXL5
12.9	J1PXK3
10.6	J1PXK4
11.0	J1PXK5
11.6	J1PXK6
9.86	J1PXK7
12.5	J1PXK8
12.0	J1PXK9
14.2	J1PXL1
15.3	J1PXL2
13.5	J1PXL3
12.9	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	12.3
Censored		Lognormal mean	12.3
Detection limit or PQL		Std. devn.	1.58
Method detection limit		Median	12.3
TOTAL	12	Min.	9.86
		Max.	15.3

Lognormal distribution? r-squared is: 0.990
Normal distribution? r-squared is: 0.982
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13.2

Lead 95% UCL Calculation

DATA	ID
2.74	J1PXL0/ J1PXL5
3.35	J1PXK3
2.54	J1PXK4
2.82	J1PXK5
2.51	J1PXK6
2.63	J1PXK7
2.51	J1PXK8
3.12	J1PXK9
4.02	J1PXL1
3.28	J1PXL2
2.82	J1PXL3
3.64	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	3.00
Censored		Lognormal mean	3.00
Detection limit or PQL		Std. devn.	0.489
Method detection limit		Median	2.82
TOTAL	12	Min.	2.51
		Max.	4.02

Lognormal distribution? r-squared is: 0.924
Normal distribution? r-squared is: 0.902
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 3.27

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

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Checked N. K. Schiffern

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Ecology Software (MTCAStat) Results, 100-D-66 Waste Site Staging Area Footprints

Manganese 95% UCL Calculation

DATA	ID
224	J1PXL0/ J1PXL5
265	J1PXK3
252	J1PXK4
232	J1PXK5
232	J1PXK6
228	J1PXK7
268	J1PXK8
239	J1PXK9
290	J1PXL1
295	J1PXL2
256	J1PXL3
249	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	253
Censored		Lognormal mean	253
Detection limit or PQL		Std. devn.	23.5
Method detection limit		Median	251
TOTAL	12	Min.	224
		Max.	295

Lognormal distribution? r-squared is: 0.949
Normal distribution? r-squared is: 0.937
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 265

Molybdenum 95% UCL Calculation

DATA	ID
0.260	J1PXL0/ J1PXL5
0.355	J1PXK3
0.345	J1PXK4
0.317	J1PXK5
0.473	J1PXK6
0.347	J1PXK7
0.338	J1PXK8
0.298	J1PXK9
0.345	J1PXL1
0.368	J1PXL2
0.329	J1PXL3
0.310	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	0.340
Censored		Lognormal mean	0.341
Detection limit or PQL		Std. devn.	0.0510
Method detection limit		Median	0.342
TOTAL	12	Min.	0.260
		Max.	0.473

Lognormal distribution? r-squared is: 0.880
Normal distribution? r-squared is: 0.831
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 0.365

Nickel 95% UCL Calculation

DATA	ID
9.60	J1PXL0/ J1PXL5
14.2	J1PXK3
9.86	J1PXK4
8.79	J1PXK5
9.40	J1PXK6
9.51	J1PXK7
9.44	J1PXK8
9.18	J1PXK9
10.5	J1PXL1
9.03	J1PXL2
8.97	J1PXL3
9.36	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	9.82
Censored		Lognormal mean	9.82
Detection limit or PQL		Std. devn.	1.45
Method detection limit		Median	9.42
TOTAL	12	Min.	8.79
		Max.	14.2

Lognormal distribution? r-squared is: 0.634
Normal distribution? r-squared is: 0.577
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 10.5

Vanadium 95% UCL Calculation

DATA	ID
36.1	J1PXL0/ J1PXL5
42.2	J1PXK3
40.3	J1PXK4
43.4	J1PXK5
39.7	J1PXK6
39.6	J1PXK7
48.6	J1PXK8
42.3	J1PXK9
52.5	J1PXL1
56.9	J1PXL2
55.1	J1PXL3
38.5	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	44.6
Censored		Lognormal mean	44.6
Detection limit or PQL		Std. devn.	6.94
Method detection limit		Median	42.3
TOTAL	12	Min.	36.1
		Max.	56.9

Lognormal distribution? r-squared is: 0.919
Normal distribution? r-squared is: 0.897
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 48.4

Zinc 95% UCL Calculation

DATA	ID
29.9	J1PXL0/ J1PXL5
34.7	J1PXK3
32.0	J1PXK4
33.8	J1PXK5
30.6	J1PXK6
30.6	J1PXK7
35.1	J1PXK8
33.8	J1PXK9
43.5	J1PXL1
43.1	J1PXL2
37.9	J1PXL3
36.4	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	35.1
Censored		Lognormal mean	35.1
Detection limit or PQL		Std. devn.	4.52
Method detection limit		Median	34.3
TOTAL	12	Min.	29.9
		Max.	43.5

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.904
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 37.6

Chloride 95% UCL Calculation

DATA	ID
2.6	J1PXL0/ J1PXL5
9.3	J1PXK3
1.8	J1PXK4
1.3	J1PXK5
2.1	J1PXK6
2.5	J1PXK7
1.1	J1PXK8
2.0	J1PXK9
3.2	J1PXL1
8.7	J1PXL2
8.7	J1PXL3
7.2	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	4.2
Censored		Lognormal mean	4.3
Detection limit or PQL		Std. devn.	3.2
Method detection limit		Median	2.5
TOTAL	12	Min.	1.1
		Max.	9.3

Lognormal distribution? r-squared is: 0.906
Normal distribution? r-squared is: 0.805
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 7.8

Nitrogen in Nitrate 95% UCL Calculation

DATA	ID
1.5	J1PXL0/ J1PXL5
12.2	J1PXK3
2.6	J1PXK4
1.1	J1PXK5
2.4	J1PXK6
1.6	J1PXK7
3.2	J1PXK8
4.4	J1PXK9
11.6	J1PXL1
7.9	J1PXL2
14.2	J1PXL3
9.9	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	6.1
Censored		Lognormal mean	6.5
Detection limit or PQL		Std. devn.	4.8
Method detection limit		Median	3.8
TOTAL	12	Min.	1.1
		Max.	14.2

Lognormal distribution? r-squared is: 0.938
Normal distribution? r-squared is: 0.882
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13.9

Nitrogen in Nitrate and Nitrite 95% UCL Calculation

DATA	ID
1.13	J1PXL0/ J1PXL5
12.2	J1PXK3
13.4	J1PXK4
1.01	J1PXK5
2.06	J1PXK6
1.91	J1PXK7
3.12	J1PXK8
4.17	J1PXK9
11.1	J1PXL1
7.05	J1PXL2
14.0	J1PXL3
8.69	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	6.7
Censored		Lognormal mean	7.4
Detection limit or PQL		Std. devn.	5.0
Method detection limit		Median	5.6
TOTAL	12	Min.	1.0
		Max.	14.0

Lognormal distribution? r-squared is: 0.922
Normal distribution? r-squared is: 0.905
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 17.4

Sulfate 95% UCL Calculation

DATA	ID
5.3	J1PXL0/ J1PXL5
89.1	J1PXK3
27.0	J1PXK4
13.0	J1PXK5
38.4	J1PXK6
60.4	J1PXK7
9.6	J1PXK8
15.5	J1PXK9
25.7	J1PXL1
33.9	J1PXL2
36.2	J1PXL3
35.1	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	32.4
Censored		Lognormal mean	34.4
Detection limit or PQL		Std. devn.	23.5
Method detection limit		Median	30.5
TOTAL	12	Min.	5.3
		Max.	89.1

Lognormal distribution? r-squared is: 0.961
Normal distribution? r-squared is: 0.874
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 63.4

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-D Field Remediation
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations

Date 10/02/12
Job No. 14655

Calc. No. 0100D-CA-V0479
Checked N. K. Schiffern

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Ecology Software (MTCAStat) Results, 100-D-66 Waste Site Staging Area Footprints

Benzo(a)anthracene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
5.00	J1PXK5
1.01	J1PXK6
1.66	J1PXK7
3.47	J1PXK8
1.04	J1PXK9
1.40	J1PXL1
14.5	J1PXL2
8.22	J1PXL3
5.61	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	3.90
Censored		Lognormal mean	3.88
Detection limit or PQL		Std. devn.	4.03
Method detection limit		Median	1.65
TOTAL	12	Min.	1.01
		Max.	14.5

Lognormal distribution? r-squared is: 0.898
Normal distribution? r-squared is: 0.726
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 5.81

Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
4.81	J1PXK5
1.63	J1PXK6
1.66	J1PXK7
2.66	J1PXK8
1.65	J1PXK9
1.02	J1PXL1
10.4	J1PXL2
6.42	J1PXL3
5.31	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	3.37
Censored		Lognormal mean	3.36
Detection limit or PQL		Std. devn.	2.84
Method detection limit		Median	1.65
TOTAL	12	Min.	1.02
		Max.	10.4

Lognormal distribution? r-squared is: 0.857
Normal distribution? r-squared is: 0.750
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 4.72

Benzo(ghi)perylene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
4.06	J1PXK5
1.63	J1PXK6
1.66	J1PXK7
2.81	J1PXK8
1.65	J1PXK9
0.884	J1PXL1
8.18	J1PXL2
5.84	J1PXL3
3.34	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	2.91
Censored		Lognormal mean	2.92
Detection limit or PQL		Std. devn.	2.17
Method detection limit		Median	1.65
TOTAL	12	Min.	0.884
		Max.	8.18

Lognormal distribution? r-squared is: 0.890
Normal distribution? r-squared is: 0.771
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 3.94

Chrysene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
5.44	J1PXK5
1.63	J1PXK6
0.863	J1PXK7
3.50	J1PXK8
0.973	J1PXK9
1.40	J1PXL1
11.9	J1PXL2
6.26	J1PXL3
6.28	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	3.60
Censored		Lognormal mean	3.65
Detection limit or PQL		Std. devn.	3.32
Method detection limit		Median	1.64
TOTAL	12	Min.	0.863
		Max.	11.9

Lognormal distribution? r-squared is: 0.911
Normal distribution? r-squared is: 0.774
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 7.20

Fluoranthene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
16.7	J1PXK5
1.63	J1PXK6
1.66	J1PXK7
5.02	J1PXK8
1.47	J1PXK9
1.17	J1PXL1
20.4	J1PXL2
12.4	J1PXL3
9.78	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	6.26
Censored		Lognormal mean	6.49
Detection limit or PQL		Std. devn.	6.85
Method detection limit		Median	1.65
TOTAL	12	Min.	1.17
		Max.	20.4

Lognormal distribution? r-squared is: 0.817
Normal distribution? r-squared is: 0.763
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 9.51

Indeno(1,2,3-cd)pyrene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
2.53	J1PXK5
1.63	J1PXK6
1.66	J1PXK7
1.72	J1PXK8
1.52	J1PXK9
1.67	J1PXL1
6.94	J1PXL2
6.18	J1PXL3
3.82	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	2.71
Censored		Lognormal mean	2.68
Detection limit or PQL		Std. devn.	1.92
Method detection limit		Median	1.66
TOTAL	12	Min.	1.52
		Max.	6.94

Lognormal distribution? r-squared is: 0.714
Normal distribution? r-squared is: 0.656
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 3.63

Pyrene 95% UCL Calculation

DATA	ID
1.62	J1PXL0/ J1PXL5
1.64	J1PXK3
1.65	J1PXK4
8.95	J1PXK5
1.63	J1PXK6
1.66	J1PXK7
4.67	J1PXK8
1.04	J1PXK9
1.57	J1PXL1
17.9	J1PXL2
9.97	J1PXL3
8.43	J1PXL4

Number of samples		Uncensored values	
Uncensored	12	Mean	5.06
Censored		Lognormal mean	5.16
Detection limit or PQL		Std. devn.	5.24
Method detection limit		Median	1.65
TOTAL	12	Min.	1.04
		Max.	17.9

Lognormal distribution? r-squared is: 0.837
Normal distribution? r-squared is: 0.750
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) is 7.55

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie	Date 10/02/12	Calc. No. 0100D-CA-V0479	Rev. No. 0
Project 100-D Field Remediation	Job No. 14655	Checked N. K. Schiffern	Date 10/02/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations			Sheet No. 22 of 23

Duplicate Analysis - 100-D-66 Waste Site Excavation

Sampling Area	Sample Number	Sample Date	Carbon-14			Cesium-137			Potassium-40			Radium-226			Radium-228			Thorium-228			Thorium-232			Uranium-233/234			Uranium-238 (AEA)		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	1.40	J	0.888	0.100		0.066	15.0		0.330	0.634		0.090	0.878		0.254	1.16		0.100	0.878		0.254	0.478		0.282	0.589		0.282
Duplicate of J1PXK0	J1PXK2	8/15/12	0.903	J	0.859	0.054		0.037	17.1		0.313	0.578		0.064	1.12		0.154	0.920		0.042	1.12		0.154	0.812		0.222	0.580		0.222

Analysis:

		Carbon-14	Cesium-137	Potassium-40	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium-233/234	Uranium-238 (AEA)
TDL		1	0.05	0.5	0.1	0.2	1	1	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD			13.1%	9.2%					
	Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Duplicate Analysis - 100-D-66 Waste Site Excavation

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			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	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	6650	J	4.27	2.28		0.855	69.8		0.427	0.303		0.171	0.520	B	1.71	0.0571	B	0.171	3430		85.5	23.7		0.171	4.87		1.71
Duplicate of J1PXK0	J1PXK2	8/15/12	6540	J	4.17	2.77		0.835	56.2		0.417	0.273		0.167	0.528	B	1.67	0.0558	B	0.167	2860		83.5	14.9		0.167	3.83		1.67

Analysis:

		Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt
TDL		5	10	2	0.2	2	0.2	100	1	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	1.7%		21.6%				18.1%	45.6%	
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 100-D-66 Waste Site Excavation

Sampling Area	Sample Number	Sample Date	Copper			Hexavalent Chromium			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	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	11.3		0.855	0.34	B	0.21	15100		17.1	3.89		0.427	3850		64.1	233		4.27	8.16		3.42	762		342	466		1.71
Duplicate of J1PXK0	J1PXK2	8/15/12	9.92		0.835	0.43	B	0.21	12800		16.7	4.08		0.417	3860		62.6	211		4.17	8.58		3.34	872		334	481		1.67

Analysis:

		Copper	Hexavalent Chromium	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Silicon
TDL		1	0.5	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)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	13.0%		16.5%		0.3%	9.9%			3.2%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable

Duplicate Analysis - 100-D-66 Waste Site Excavation

Sampling Area	Sample Number	Sample Date	Sodium			Vanadium			Zinc			Nitrogen in Nitrite and Nitrate			Sulfate			Benzo(a)anthracene			Fluoranthene			Pyrene		
			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	ug/kg	Q	PQL
A-11	J1PXK0	8/15/12	163		42.7	33.4		2.14	33.2		8.55	0.24	B	0.10	6.6		1.0	1.98	J	3.42	1.92	J	3.42	2.09	J	3.42
Duplicate of J1PXK0	J1PXK2	8/15/12	130		41.7	23.8		2.09	28.8		8.35	0.61		0.08	22.4		1.0	1.13	J	3.43	1.19	J	3.43	1.24	J	3.43

Analysis:

		Sodium	Vanadium	Zinc	Nitrogen in Nitrite and Nitrate	Sulfate	Benzo(a)anthracene	Fluoranthene	Pyrene
TDL		50	2.5	1	0.75	5	15	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)			
	RPD		33.6%	14.2%					
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Yes - assess further	No - acceptable	No - acceptable	No - acceptable

Acronyms and qualifiers are defined on sheet 3.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie	**Date** 10/02/12	**Calc. No.** 0100D-CA-V0479	**Rev. No.** 0
Project 100-D Field Remediation	**Job No.** 14655	**Checked** N. K. Schiffern	**Date** 10/02/12
Subject 100-D-66 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 23 of 23

Duplicate Analysis - 100-D-66 Waste Site Staging Area Footprints

Sampling Area	Sample Number	Sample Date	Potassium-40 pCi/g	Q	MDA	Radium-226 pCi/g	Q	MDA	Radium-228 pCi/g	Q	MDA	Thorium-228 pCi/g	Q	MDA	Thorium-232 pCi/g	Q	MDA	Uranium-233/234 pCi/g	Q	MDA	Uranium-238 (AEA) pCi/g	Q	MDA	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL
B-8	J1PXL0	8/16/12	15.0		0.074	0.491		0.014	0.793		0.026	0.752		0.010	0.793		0.026	0.530		0.270	0.495		0.270	6520		4.60	2.77		0.920
Duplicate of J1PXL0	J1PXL5	8/16/12	12.1		0.254	0.391		0.038	0.595		0.107	0.589		0.028	0.595		0.107	0.561		0.195	0.536		0.195	5890		4.86	2.70		0.972

Analysis:

		Potassium-40	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium-233/234	Uranium-238 (AEA)	Aluminum	Arsenic
TDL		0.5	0.1	0.2	1	1	1	1	5	10
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	21.4%							10.2%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Duplicate Analysis - 100-D-66 Waste Site Staging Area Footprints

Sampling Area	Sample Number	Sample Date	Barium mg/kg	Q	PQL	Beryllium mg/kg	Q	PQL	Boron mg/kg	Q	PQL	Cadmium mg/kg	Q	PQL	Calcium mg/kg	Q	PQL	Chromium mg/kg	Q	PQL	Cobalt mg/kg	Q	PQL	Copper mg/kg	Q	PQL	Iron mg/kg	Q	PQL
B-8	J1PXL0	8/16/12	69.7		0.460	0.227		0.184	1.73	B	1.84	0.0773	B	0.184	6920		92.0	10.6		0.184	4.28		1.84	11.6		0.920	14300		18.4
Duplicate of J1PXL0	J1PXL5	8/16/12	49.1		0.486	0.200		0.194	0.758	B	1.94	0.0811	B	0.194	6770		97.2	11.3		0.194	4.45		1.94	10.4		0.972	14600		19.4

Analysis:

		Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
TDL		2	0.2	2	0.2	100	1	2	1	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	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)	Yes (calc RPD)	Yes (calc RPD)
	RPD	34.7%				2.2%	6.4%		10.9%	2.1%
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 100-D-66 Waste Site Staging Area Footprints

Sampling Area	Sample Number	Sample Date	Lead mg/kg	Q	PQL	Magnesium mg/kg	Q	PQL	Manganese mg/kg	Q	PQL	Molybdenum mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Potassium mg/kg	Q	PQL	Silicon mg/kg	Q	PQL	Sodium mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL
B-8	J1PXL0	8/16/12	2.69		0.460	3970		69.0	221		4.60	0.286	B	1.84	9.41		3.68	1000		368	379		1.84	256		46.0	36.2		2.30
Duplicate of J1PXL0	J1PXL5	8/16/12	2.78		0.486	4070		72.9	227		4.86	0.233	B	1.94	9.78		3.89	918		389	351		1.94	268		48.6	35.9		2.43

Analysis:

		Lead	Magnesium	Manganese	Molybdenum	Nickel	Potassium	Silicon	Sodium	Vanadium
TDL		5	75	5	2	4	400	2	50	2.5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)
	RPD		2.5%	2.7%				7.7%	4.6%	0.8%
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	Not applicable

Duplicate Analysis - 100-D-66 Waste Site Staging Area Footprints

Sampling Area	Sample Number	Sample Date	Zinc mg/kg	Q	PQL	Chloride mg/kg	Q	PQL	Nitrogen in Nitrate [a] mg/kg	Q	PQL	Nitrogen in Nitrite and Nitrate mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL
B-8	J1PXL0	8/16/12	30.1		9.20	4.1	B	1.0	1.8		0.2	1.28		0.10	6.5		1.0
Duplicate of J1PXL0	J1PXL5	8/16/12	29.7		9.72	1.0	B	1.0	1.2		0.2	0.97		0.10	4.1	B	1.0

Analysis:

		Zinc	Chloride	Nitrogen in Nitrate [a]	Nitrogen in Nitrite and Nitrate	Sulfate
TDL		1	2	0.75	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	1.3%				
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Acronyms and qualifiers are defined on sheet 3.

[a] Nitrate has been converted to nitrogen in nitrate

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Radionuclides).

LOCATION	HEIS Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	0.457	U	0.457	1.40	J	0.888	0.100		0.066	0.058	U	0.058	0.147	U	0.147	0.189	U	0.189
Duplicate of J1PXK0	J1PXK2	8/15/12	0.132	U	0.132	0.903	J	0.859	0.054		0.037	0.037	U	0.037	0.093	U	0.093	0.127	U	0.127
A-1	J1PXJ0	8/15/12	0.035	U	0.035	0.714	UJ	0.923	0.007	U	0.007	0.007	U	0.007	0.019	U	0.019	0.024	U	0.024
A-2	J1PXJ1	8/15/12	0.142	U	0.142	1.09	J	0.882	0.016	U	0.016	0.017	U	0.017	0.041	U	0.041	0.056	U	0.056
A-3	J1PXJ2	8/15/12	0.014	U	0.014	1.14	J	0.847	0.030		0.006	0.006	U	0.006	0.034		0.022	0.022	U	0.022
A-4	J1PXJ3	8/15/12	0.038	U	0.038	0.960	J	0.913	0.006	U	0.006	0.006	U	0.006	0.015	U	0.015	0.020	U	0.020
A-5	J1PXJ4	8/15/12	0.037	U	0.037	0.948	J	0.919	0.056		0.012	0.010	U	0.010	0.020		0.019	0.034	U	0.034
A-6	J1PXJ5	8/15/12	0.012	U	0.012	1.05	J	0.924	0.008	U	0.008	0.009	U	0.009	0.025	U	0.025	0.029	U	0.029
A-7	J1PXJ6	8/15/12	0.156	U	0.156	1.46	J	0.931	1.14		0.046	0.091	U	0.091	2.14		0.101	0.146		0.118
A-8	J1PXJ7	8/15/12	0.116	U	0.116	1.68	J	0.851	2.78		0.033	0.046	U	0.046	0.514		0.076	0.075	U	0.075
A-9	J1PXJ8	8/15/12	0.051	U	0.051	1.11	J	0.839	0.026	U	0.026	0.023	U	0.023	0.072	U	0.072	0.090	U	0.090
A-10	J1PXJ9	8/15/12	0.188	U	0.188	0.669	UJ	0.839	0.933		0.038	0.029	U	0.029	0.375		0.078	0.105	U	0.105
A-12	J1PXK1	8/15/12	0.040	U	0.040	0.813	UJ	0.845	0.053		0.025	0.018	U	0.018	0.072		0.055	0.063	U	0.063
B-8	J1PXL0	8/16/12	0.016	U	0.016	1.00		0.872	0.007	U	0.007	0.007	U	0.007	0.021	U	0.021	0.026	U	0.026
Duplicate of J1PXL0	J1PXL5	8/16/12	0.088	U	0.088	0.131	U	0.827	0.021	U	0.021	0.024	U	0.024	0.056	U	0.056	0.083	U	0.083
B-1	J1PXK3	8/16/12	0.100	U	0.100	0.368	U	0.906	0.020	U	0.020	0.018	U	0.018	0.056	U	0.056	0.071	U	0.071
B-2	J1PXK4	8/16/12	0.385	U	0.385	1.04		0.900	0.048	U	0.048	0.045	U	0.045	0.124	U	0.124	0.170	U	0.170
B-3	J1PXK5	8/16/12	0.045	U	0.045	1.03		0.938	0.160		0.021	0.041	U	0.041	0.442		0.061	0.080	U	0.080
B-4	J1PXK6	8/16/12	0.129	U	0.129	1.26		0.886	0.021	U	0.021	0.021	U	0.021	0.048	U	0.048	0.071	U	0.071
B-5	J1PXK7	8/16/12	0.031	U	0.031	1.05		0.896	0.016		0.005	0.006	U	0.006	0.018	U	0.018	0.021	U	0.021
B-6	J1PXK8	8/16/12	0.042	U	0.042	1.33		0.841	0.141		0.036	0.031	U	0.031	0.108		0.067	0.102	U	0.102
B-7	J1PXK9	8/16/12	0.121	U	0.121	0.952		0.931	0.336		0.016	0.014	U	0.014	0.213		0.04	0.048	U	0.048
B-9	J1PXL1	8/16/12	0.053	U	0.053	0.211	U	0.886	0.403		0.010	0.033		0.008	0.480		0.023	0.033		0.026
B-10	J1PXL2	8/16/12	0.015	U	0.015	0.326	U	0.927	0.037		0.013	0.010	U	0.010	0.030	U	0.030	0.033	U	0.033
B-11	J1PXL3	8/16/12	0.030	U	0.030	4.12		0.877	0.037		0.007	0.008	U	0.008	0.029		0.021	0.028	U	0.028
B-12	J1PXL4	8/16/12	0.046	U	0.046	0.287	U	0.900	0.698		0.040	0.032	U	0.032	0.340		0.102	0.100	U	0.100

Attachment	1	Sheet No.	1 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

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, D, and/or J.

B = blank contamination (inorganic constituents)

D = identifies all compounds identified in an analysis at a secondary dilution factor

HEIS = Hanford Environmental Information System

J = estimate

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

PEST = pesticides

R = rejected

SVOA = semivolatile organic analysis

U = undetected

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Radionuclides).

LOCATION	HEIS Number	Sample Date	Europium-155			Nickel-63			Plutonium-238			Plutonium-239/240			Potassium-40			Radium-226		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	0.172	U	0.172	-0.532	U	3.32	0	U	0.232	0	U	0.232	15.0		0.330	0.634		0.090
Duplicate of J1PXK0	J1PXK2	8/15/12	0.092	U	0.092	-1.99	U	3.52	-0.029	U	0.220	0	U	0.220	17.1		0.313	0.578		0.064
A-1	J1PXJ0	8/15/12	0.030	U	0.030	0.685	U	3.47	0.014	U	0.038	-0.003	U	0.033	15.4		0.068	0.504		0.014
A-2	J1PXJ1	8/15/12	0.053	U	0.053	0.044	U	3.53	0.300		0.050	2.51		0.035	13.6		0.159	0.602		0.031
A-3	J1PXJ2	8/15/12	0.038	U	0.038	6.21		3.31	0	U	0.039	0	U	0.024	12.2		0.066	0.457		0.014
A-4	J1PXJ3	8/15/12	0.047	U	0.047	0.082	U	3.32	0.009	U	0.047	-0.003	U	0.029	9.96		0.064	0.342		0.012
A-5	J1PXJ4	8/15/12	0.061	U	0.061	-1.11	U	3.60	0.026	U	0.201	0.158	U	0.201	13.9		0.094	0.458		0.018
A-6	J1PXJ5	8/15/12	0.028	U	0.028	-0.331	U	3.36	0	U	0.239	0.125	U	0.239	11.5		0.103	0.421		0.015
A-7	J1PXJ6	8/15/12	0.135	U	0.135	17.8		3.38	0.027	U	0.207	0.298		0.207	16.0		0.200	0.606		0.074
A-8	J1PXJ7	8/15/12	0.096	U	0.096	1.92	U	3.45	0.026	U	0.197	0.206		0.197	15.4		0.211	0.512		0.051
A-9	J1PXJ8	8/15/12	0.112	U	0.112	-0.838	U	3.40	-0.026	U	0.202	0.264		0.202	14.0		0.245	0.466		0.051
A-10	J1PXJ9	8/15/12	0.097	U	0.097	0.800	U	3.24	0.024	U	0.181	0.189		0.181	16.2		0.278	0.556		0.062
A-12	J1PXK1	8/15/12	0.057	U	0.057	-1.54	U	3.48	0	U	0.222	0	U	0.222	11.9		0.190	0.391		0.037
B-8	J1PXL0	8/16/12	0.024	U	0.024	-0.359	U	2.97	0	U	0.180	0.023	U	0.180	15.0		0.074	0.491		0.014
Duplicate of J1PXL0	J1PXL5	8/16/12	0.065	U	0.065	1.3	U	3.12	0.023	U	0.173	0	U	0.173	12.1		0.254	0.391		0.038
B-1	J1PXK3	8/16/12	0.080	U	0.080	-0.159	U	2.97	0.051	U	0.193	0.025	U	0.193	14.0		0.176	0.526		0.040
B-2	J1PXK4	8/16/12	0.144	U	0.144	0.197	U	2.93	-0.029	U	0.225	0	U	0.225	13.3		0.372	0.459		0.076
B-3	J1PXK5	8/16/12	0.105	U	0.105	1.88	U	2.98	0	U	0.206	0.027	U	0.206	13.5		0.217	0.461		0.044
B-4	J1PXK6	8/16/12	0.065	U	0.065	-0.250	U	3.10	0	U	0.171	0	U	0.171	12.8		0.222	0.416		0.038
B-5	J1PXK7	8/16/12	0.031	U	0.031	-0.245	U	3.05	0.026	U	0.202	0	U	0.202	13.7		0.057	0.441		0.013
B-6	J1PXK8	8/16/12	0.076	U	0.076	0.285	U	3.04	-0.026	U	0.202	0	U	0.202	15.6		0.366	0.505		0.055
B-7	J1PXK9	8/16/12	0.047	U	0.047	1.04	U	3.11	0.026	U	0.199	0	U	0.199	12.8		0.127	0.436		0.028
B-9	J1PXL1	8/16/12	0.046	U	0.046	3.31		3.16	0.021	U	0.162	0.042	U	0.162	13.2		0.079	0.521		0.018
B-10	J1PXL2	8/16/12	0.059	U	0.059	0.779	U	3.23	0	U	0.170	0	U	0.170	14.6		0.117	0.561		0.020
B-11	J1PXL3	8/16/12	0.035	U	0.035	-0.738	U	3.06	0.023	U	0.177	0	U	0.177	11.1		0.078	0.438		0.015
B-12	J1PXL4	8/16/12	0.104	U	0.104	0.759	U	3.15	-0.046	U	0.221	0	U	0.176	17.4		0.331	0.650		0.059

Attachment	1	Sheet No.	2 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Radionuclides).

LOCATION	HEIS Number	Sample Date	Radium-228			Thorium-228			Thorium-232			Total beta radiostrontium			Tritium			Uranium-233/234		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	0.878		0.254	1.16		0.100	0.878		0.254	0.148	U	0.241	1.67	UJ	3.75	0.478		0.282
Duplicate of J1PXK0	J1PXK2	8/15/12	1.12		0.154	0.920		0.042	1.12		0.154	0.054	U	0.272	0.72	UJ	3.83	0.812		0.222
A-1	J1PXJ0	8/15/12	0.774		0.031	0.745		0.010	0.774		0.031	0.078	U	0.254	-0.059	UJ	3.75	0.569		0.182
A-2	J1PXJ1	8/15/12	0.920		0.073	1.18		0.033	0.920		0.073	-0.074	U	0.250	-0.237	UJ	3.46	0.491		0.188
A-3	J1PXJ2	8/15/12	0.780		0.023	0.754		0.009	0.780		0.023	0.001	U	0.236	1.82	UJ	3.42	0.925		0.165
A-4	J1PXJ3	8/15/12	0.547		0.028	0.529		0.009	0.547		0.028	-0.019	U	0.262	0.576	UJ	3.36	0.324		0.206
A-5	J1PXJ4	8/15/12	0.910		0.038	0.836		0.012	0.910		0.038	-0.018	U	0.248	1.42	UJ	3.77	0.676		0.192
A-6	J1PXJ5	8/15/12	0.604		0.039	0.705		0.013	0.604		0.039	-0.010	U	0.261	0	UJ	3.57	0.739		0.226
A-7	J1PXJ6	8/15/12	0.887		0.158	0.866		0.051	0.887		0.158	0.043	U	0.227	1.97	UJ	3.97	0.496		0.253
A-8	J1PXJ7	8/15/12	0.709		0.095	0.760		0.039	0.709		0.095	0.061	U	0.260	0.512	UJ	3.32	0.433		0.207
A-9	J1PXJ8	8/15/12	1.01		0.076	0.860		0.034	1.01		0.076	-0.049	U	0.234	9.16	J	5.19	0.602		0.184
A-10	J1PXJ9	8/15/12	0.894		0.121	0.847		0.043	0.894		0.121	0.044	U	0.246	0.948	UJ	3.69	0.779		0.192
A-12	J1PXK1	8/15/12	0.644		0.085	0.620		0.025	0.644		0.085	0.061	U	0.244	0.442	UJ	3.69	0.425		0.217
B-8	J1PXL0	8/16/12	0.793		0.026	0.752		0.010	0.793		0.026	0.021	U	0.243	0.854	U	2.98	0.530		0.270
Duplicate of J1PXL0	J1PXL5	8/16/12	0.595		0.107	0.589		0.028	0.595		0.107	0.392		0.229	3.53	U	3.61	0.561		0.195
B-1	J1PXK3	8/16/12	0.873		0.085	0.752		0.030	0.873		0.085	0.150	U	0.260	1.36	U	2.88	0.614		0.214
B-2	J1PXK4	8/16/12	0.644		0.200	0.839		0.088	0.644		0.200	0.029	U	0.250	1.14	U	3.23	0.647		0.381
B-3	J1PXK5	8/16/12	0.682		0.112	0.657		0.031	0.682		0.112	-0.082	U	0.263	1.96	U	3.52	0.303		0.257
B-4	J1PXK6	8/16/12	0.604		0.077	0.554		0.028	0.604		0.077	-0.020	U	0.259	0.487	U	2.89	0.457		0.184
B-5	J1PXK7	8/16/12	0.707		0.027	0.639		0.009	0.707		0.027	0.046	U	0.260	2.23	U	3.89	0.128	U	0.244
B-6	J1PXK8	8/16/12	0.679		0.138	0.866		0.042	0.679		0.138	-0.018	U	0.233	1.73	U	3.02	0.578		0.276
B-7	J1PXK9	8/16/12	0.681		0.059	0.856		0.029	0.681		0.059	0.009	U	0.239	1.03	U	3.39	0.421		0.322
B-9	J1PXL1	8/16/12	0.780		0.038	0.796		0.012	0.780		0.038	0.220	U	0.249	0.431	U	2.84	0.698		0.267
B-10	J1PXL2	8/16/12	0.844		0.048	1.03		0.015	0.844		0.048	0.091	U	0.270	0.631	U	3.12	0.440		0.211
B-11	J1PXL3	8/16/12	0.668		0.032	0.603		0.010	0.668		0.032	-0.008	U	0.262	2.13	U	3.33	0.513		0.231
B-12	J1PXL4	8/16/12	0.890		0.118	1.05		0.048	0.890		0.118	0.111	U	0.234	1.27	U	3.28	0.505		0.176

Attachment	1	Sheet No.	3 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Radionuclides).

LOCATION	HEIS Number	Sample Date	Uranium-235 (AEA)			Uranium-235 (GEA)			Uranium-238 (AEA)			Uranium-238 (GEA)		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A-11	J1PXK0	8/15/12	0.045	UJ	0.341	0.343	U	0.343	0.589		0.282	7.15	U	7.15
Duplicate of J1PXK0	J1PXK2	8/15/12	0	UJ	0.268	0.192	U	0.192	0.580		0.222	4.48	U	4.48
A-1	J1PXJ0	8/15/12	0.057	UJ	0.220	0.086	U	0.086	0.498		0.182	1.38	U	1.38
A-2	J1PXJ1	8/15/12	0.089	UJ	0.228	0.127	U	0.127	0.467		0.188	2.01	U	2.01
A-3	J1PXJ2	8/15/12	0.052	UJ	0.199	0.101	U	0.101	0.947		0.165	1.49	U	1.49
A-4	J1PXJ3	8/15/12	0	UJ	0.250	0.057	U	0.057	0.513		0.206	0.705	U	0.705
A-5	J1PXJ4	8/15/12	0	UJ	0.232	0.115	U	0.115	0.676		0.192	1.18	U	1.18
A-6	J1PXJ5	8/15/12	0.143	UJ	0.274	0.060	U	0.060	0.502		0.226	1.05	U	1.05
A-7	J1PXJ6	8/15/12	0.040	UJ	0.306	0.255	U	0.255	0.694		0.253	4.42	U	4.42
A-8	J1PXJ7	8/15/12	0.098	UJ	0.250	0.183	U	0.183	0.568		0.207	2.64	U	2.64
A-9	J1PXJ8	8/15/12	0.029	UJ	0.223	0.156	U	0.156	0.482		0.184	3.35	U	3.35
A-10	J1PXJ9	8/15/12	0.030	UJ	0.233	0.176	U	0.176	0.502		0.192	3.38	U	3.38
A-12	J1PXK1	8/15/12	0	UJ	0.262	0.126	U	0.126	0.368		0.217	2.56	U	2.56
B-8	J1PXL0	8/16/12	0	U	0.328	0.086	U	0.086	0.495		0.270	1.78	U	1.78
Duplicate of J1PXL0	J1PXL5	8/16/12	0.062	U	0.236	0.134	U	0.134	0.536		0.195	4.24	U	4.24
B-1	J1PXK3	8/16/12	0.034	U	0.259	0.158	U	0.158	0.642		0.214	2.39	U	2.39
B-2	J1PXK4	8/16/12	0	U	0.461	0.280	U	0.280	0.647		0.381	5.74	U	5.74
B-3	J1PXK5	8/16/12	0.081	U	0.312	0.145	U	0.145	0.538		0.257	3.03	U	3.03
B-4	J1PXK6	8/16/12	0.029	U	0.223	0.116	U	0.116	0.337		0.184	2.10	U	2.10
B-5	J1PXK7	8/16/12	0.039	U	0.295	0.048	U	0.048	0.606		0.244	0.975	U	0.975
B-6	J1PXK8	8/16/12	0	U	0.334	0.202	U	0.202	0.325		0.276	3.21	U	3.21
B-7	J1PXK9	8/16/12	0	U	0.390	0.094	U	0.094	0.631		0.322	1.72	U	1.72
B-9	J1PXL1	8/16/12	0.042	U	0.323	0.072	U	0.072	0.732		0.267	0.973	U	0.973
B-10	J1PXL2	8/16/12	0.033	U	0.255	0.118	U	0.118	0.716		0.211	1.87	U	1.87
B-11	J1PXL3	8/16/12	0.073	U	0.280	0.047	U	0.047	0.332		0.231	0.946	U	0.946
B-12	J1PXL4	8/16/12	0	U	0.212	0.220	U	0.220	0.413		0.176	3.72	U	3.72

Attachment	1	Sheet No.	4 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Metals).

LOCATION	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	6650	J	4.27	0.513	UJ	0.513	2.28		0.855	69.8		0.427	0.303		0.171	0.520	B	1.71
Duplicate of J1PXK0	J1PXK2	8/15/12	6540	J	4.17	0.501	UJ	0.501	2.77		0.835	56.2		0.417	0.273		0.167	0.528	B	1.67
A-1	J1PXJ0	8/15/12	5530	J	4.20	0.504	UJ	0.504	2.80		0.839	48.3		0.420	0.185		0.168	0.763	B	1.68
A-2	J1PXJ1	8/15/12	8580	J	4.47	0.536	UJ	0.536	3.34		0.894	63.5		0.447	0.309		0.179	1.55	B	1.79
A-3	J1PXJ2	8/15/12	7690	J	4.08	0.490	UJ	0.490	2.60		0.816	77.7		0.408	0.289		0.163	1.41	B	1.63
A-4	J1PXJ3	8/15/12	4880	J	4.00	0.480	UJ	0.480	1.69		0.800	54.7		0.400	0.210		0.160	0.547	B	1.60
A-5	J1PXJ4	8/15/12	11200	J	4.01	0.482	UJ	0.482	3.14		0.803	90.0		0.401	0.448		0.161	1.70		1.61
A-6	J1PXJ5	8/15/12	3650	J	3.58	0.430	UJ	0.430	1.11		0.717	50.6		0.358	0.164		0.143	1.43	U	1.43
A-7	J1PXJ6	8/15/12	8230	J	4.94	0.593	UJ	0.593	2.64		0.989	64.7		0.494	0.320		0.198	0.752	B	1.98
A-8	J1PXJ7	8/15/12	6760	J	3.65	0.438	UJ	0.438	2.34		0.730	52.0		0.365	0.252		0.146	0.660	B	1.46
A-9	J1PXJ8	8/15/12	10300	J	4.58	0.550	UJ	0.550	2.50		0.916	83.9		0.458	0.427		0.183	1.13	B	1.83
A-10	J1PXJ9	8/15/12	7590	J	4.91	0.589	UJ	0.589	2.56		0.981	54.2		0.491	0.276		0.196	0.720	B	1.96
A-12	J1PXK1	8/15/12	5580	J	3.54	0.425	UJ	0.425	1.67		0.708	58.3		0.354	0.227		0.142	0.575	B	1.42
B-8	J1PXL0	8/16/12	6520		4.60	0.552	U	0.552	2.77		0.920	69.7		0.460	0.227		0.184	1.73	B	1.84
Duplicate of J1PXL0	J1PXL5	8/16/12	5890		4.86	0.583	U	0.583	2.70		0.972	49.1		0.486	0.200		0.194	0.758	B	1.94
B-1	J1PXK3	8/16/12	7200		4.25	0.510	U	0.510	3.73		0.850	59.2		0.425	0.226		0.17	1.12	B	1.70
B-2	J1PXK4	8/16/12	5840		4.70	0.564	U	0.564	2.55		0.940	49.3		0.470	0.191		0.188	0.809	B	1.88
B-3	J1PXK5	8/16/12	5850		4.73	0.568	U	0.568	2.76		0.946	60.8		0.473	0.203		0.189	0.871	B	1.89
B-4	J1PXK6	8/16/12	5750		4.64	0.556	U	0.556	2.64		0.927	48.8		0.464	0.193		0.185	0.726	B	1.85
B-5	J1PXK7	8/16/12	5850		4.83	0.353	B	0.580	2.80		0.967	47.8		0.483	0.202		0.193	0.722	B	1.93
B-6	J1PXK8	8/16/12	6070		4.26	0.511	U	0.511	2.14		0.852	51.5		0.426	0.206		0.170	0.752	B	1.70
B-7	J1PXK9	8/16/12	6870		4.68	0.562	U	0.562	2.28		0.936	55.8		0.468	0.251		0.187	0.955	B	1.87
B-9	J1PXL1	8/16/12	8560		4.94	0.592	U	0.592	4.10		0.987	71.9		0.494	0.303		0.197	1.41	B	1.97
B-10	J1PXL2	8/16/12	6770		4.82	0.578	U	0.578	2.41		0.964	61.0		0.482	0.260		0.193	1.31	B	1.93
B-11	J1PXL3	8/16/12	6260		4.26	0.511	U	0.511	2.30		0.851	53.6		0.426	0.233		0.170	1.24	B	1.70
B-12	J1PXL4	8/16/12	8490		4.87	0.585	U	0.585	2.64		0.974	68.0		0.487	0.316		0.195	0.910	B	1.95
Equipment Blank	J1PXL6	8/16/12	194		4.24	0.509	U	0.509	0.848	U	0.848	1.78		0.424	0.170	U	0.170	1.70	U	1.70

Attachment	1	Sheet No.	5 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Metals).

LOCATION	HEIS Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	0.0571	B	0.171	3430		85.5	23.7		0.171	4.87		1.71	11.3		0.855	0.34	B	0.21
Duplicate of J1PXK0	J1PXK2	8/15/12	0.0558	B	0.167	2860		83.5	14.9		0.167	3.83		1.67	9.92		0.835	0.43	B	0.21
A-1	J1PXJ0	8/15/12	0.0759	B	0.168	6030		83.9	10.8		0.168	3.57		1.68	9.79		0.839	0.21	U	0.21
A-2	J1PXJ1	8/15/12	0.0675	B	0.179	5440		89.4	12.0		0.179	6.09		1.79	12.1		0.894	0.20	U	0.20
A-3	J1PXJ2	8/15/12	0.0669	B	0.163	6530		81.6	9.62		0.163	6.48		1.63	13.3		0.816	0.20	U	0.20
A-4	J1PXJ3	8/15/12	0.0516	B	0.160	6870		80.0	6.27		0.160	6.98		1.60	13.6		0.800	0.20	U	0.20
A-5	J1PXJ4	8/15/12	0.0928	B	0.161	6920		80.3	12.7		0.161	6.77		1.61	16.9		0.803	0.20	U	0.20
A-6	J1PXJ5	8/15/12	0.0481	B	0.143	5360		71.7	3.63		0.143	6.06		1.43	11.1		0.717	0.20	U	0.20
A-7	J1PXJ6	8/15/12	0.164	B	0.198	6240		98.9	26.0		0.198	5.79		1.98	14.2		0.989	0.26	B	0.21
A-8	J1PXJ7	8/15/12	0.0569	B	0.146	6030		73.0	15.7		0.146	4.87		1.46	11.6		0.730	0.20	U	0.20
A-9	J1PXJ8	8/15/12	0.0604	B	0.183	6890		91.6	11.0		0.183	6.47		1.83	14.6		0.916	0.20	U	0.20
A-10	J1PXJ9	8/15/12	0.0646	B	0.196	5120		98.1	17.1		0.196	4.80		1.96	11.2		0.981	0.20	U	0.20
A-12	J1PXK1	8/15/12	0.0457	B	0.142	4730		70.8	7.1		0.142	5.85		1.42	11.9		0.708	0.20	U	0.20
B-8	J1PXL0	8/16/12	0.0773	B	0.184	6920		92.0	10.6		0.184	4.28		1.84	11.6		0.920	0.20	U	0.20
Duplicate of J1PXL0	J1PXL5	8/16/12	0.0811	B	0.194	6770		97.2	11.3		0.194	4.45		1.94	10.4		0.972	0.20	U	0.20
B-1	J1PXK3	8/16/12	0.0807	B	0.170	6190		85.0	15.2		0.170	5.62		1.70	12.9		0.850	0.20	U	0.20
B-2	J1PXK4	8/16/12	0.0675	B	0.188	6450		94.0	11.3		0.188	4.90		1.88	10.6		0.940	0.20	U	0.20
B-3	J1PXK5	8/16/12	0.0923	B	0.189	6840		94.6	10.8		0.189	4.95		1.89	11.0		0.946	0.20	U	0.20
B-4	J1PXK6	8/16/12	0.0664	B	0.185	6510		92.7	10.1		0.185	4.87		1.85	11.6		0.927	0.20	U	0.20
B-5	J1PXK7	8/16/12	0.0749	B	0.193	6660		96.7	11.4		0.193	4.71		1.93	9.86		0.967	0.20	U	0.20
B-6	J1PXK8	8/16/12	0.0980	B	0.170	5610		85.2	10.7		0.170	5.72		1.70	12.5		0.852	0.20	U	0.20
B-7	J1PXK9	8/16/12	0.0705	B	0.187	5860		93.6	12.7		0.187	5.29		1.87	12.0		0.936	0.20	U	0.20
B-9	J1PXL1	8/16/12	0.102	B	0.197	6170		98.7	11.8		0.197	6.45		1.97	14.2		0.987	0.20	U	0.20
B-10	J1PXL2	8/16/12	0.0673	B	0.193	6830		96.4	8.54		0.193	6.98		1.93	15.3		0.964	0.20	U	0.20
B-11	J1PXL3	8/16/12	0.0666	B	0.170	7440		85.1	9.42		0.170	5.85		1.70	13.5		0.851	0.20	U	0.20
B-12	J1PXL4	8/16/12	0.0743	B	0.195	5270		97.4	14.5		0.195	5.26		1.95	12.9		0.974	0.20	U	0.20
Equipment Blank	J1PXL6	8/16/12	0.170	U	0.170	30.5	B	84.8	0.170	U	0.170	1.70	U	1.70	0.848	U	0.848			

Attachment	1	Sheet No.	6 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Metals).

LOCATION	HEIS Number	Sample Date	Iron			Lead			Magnesium			Manganese			Mercury			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	15100		17.1	3.89		0.427	3850		64.1	233		4.27	0.0284	U	0.0284	0.193	B	1.71
Duplicate of J1PXK0	J1PXK2	8/15/12	12800		16.7	4.08		0.417	3860		62.6	211		4.17	0.0282	U	0.0282	1.67	U	1.67
A-1	J1PXJ0	8/15/12	11500		16.8	2.73		0.420	3640		63.0	196		4.20	0.0297	U	0.0297	0.272	B	1.68
A-2	J1PXJ1	8/15/12	17000		17.9	4.23		0.447	4150		67.0	282		4.47	0.0244	U	0.0244	0.434	B	1.79
A-3	J1PXJ2	8/15/12	19300		16.3	3.62		0.408	4700		61.2	286		4.08	0.0260	U	0.0260	0.320	B	1.63
A-4	J1PXJ3	8/15/12	21300		16.0	2.54		0.400	4390		60.0	298		4.00	0.0275	U	0.0275	0.309	B	1.60
A-5	J1PXJ4	8/15/12	18900		16.1	5.08		0.401	5430		60.2	253		4.01	0.0268	U	0.0268	0.273	B	1.61
A-6	J1PXJ5	8/15/12	19200		14.3	1.87		0.358	3580		53.8	247		3.58	0.0251	U	0.0251	0.321	B	1.43
A-7	J1PXJ6	8/15/12	18100		19.8	4.13		0.494	6320		74.1	273		4.94	0.274		0.0300	0.263	B	1.98
A-8	J1PXJ7	8/15/12	14800		14.6	3.25		0.365	5150		54.7	224		3.65	0.0383		0.0252	0.196	B	1.46
A-9	J1PXJ8	8/15/12	19900		18.3	4.27		0.458	5020		68.7	245		4.58	0.0267	U	0.0267	0.212	B	1.83
A-10	J1PXJ9	8/15/12	15100		19.6	3.74		0.491	5420		73.6	236		4.91	0.0440		0.0257	1.96	U	1.96
A-12	J1PXK1	8/15/12	16700		14.2	2.63		0.354	3890		53.1	245		3.54	0.0274	U	0.0274	0.204	B	1.42
B-8	J1PXL0	8/16/12	14300		18.4	2.69		0.460	3970		69.0	221		4.60	0.0268	U	0.0268	0.286	B	1.84
Duplicate of J1PXL0	J1PXL5	8/16/12	14600		19.4	2.78		0.486	4070		72.9	227		4.86	0.0284	U	0.0284	0.233	B	1.94
B-1	J1PXK3	8/16/12	16400		17.0	3.35		0.425	4830		63.7	265		4.25	0.0282	U	0.0282	0.355	B	1.70
B-2	J1PXK4	8/16/12	15500		18.8	2.54		0.470	4240		70.5	252		4.70	0.0269	U	0.0269	0.345	B	1.88
B-3	J1PXK5	8/16/12	15700		18.9	2.82		0.473	3840		71.0	232		4.73	0.0291	U	0.0291	0.317	B	1.89
B-4	J1PXK6	8/16/12	15300		18.5	2.51		0.464	3880		69.5	232		4.64	0.0257	U	0.0257	0.473	B	1.85
B-5	J1PXK7	8/16/12	14800		19.3	2.63		0.483	3960		72.5	228		4.83	0.0245	U	0.0245	0.347	B	1.93
B-6	J1PXK8	8/16/12	17800		17.0	2.51		0.426	4340		63.9	268		4.26	0.0283	U	0.0283	0.338	B	1.70
B-7	J1PXK9	8/16/12	16500		18.7	3.12		0.468	4450		70.2	239		4.68	0.0239	U	0.0239	0.298	B	1.87
B-9	J1PXL1	8/16/12	19600		19.7	4.02		0.494	4370		74.0	290		4.94	0.0120	B	0.0245	0.345	B	1.97
B-10	J1PXL2	8/16/12	19800		19.3	3.28		0.482	4020		72.3	295		4.82	0.0237	U	0.0237	0.368	B	1.93
B-11	J1PXL3	8/16/12	18700		17.0	2.82		0.426	3960		63.8	256		4.26	0.0238	U	0.0238	0.329	B	1.70
B-12	J1PXL4	8/16/12	16900		19.5	3.64		0.487	4950		73.1	249		4.87	0.0175	B	0.0246	0.310	B	1.95
Equipment Blank	J1PXL6	8/16/12	254		17.0	0.335	B	0.424	18.8	B	63.6	5.21		4.24	0.0265	U	0.0265	1.70	U	1.70

Attachment	1	Sheet No.	7 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Metals).

LOCATION	HEIS Number	Sample Date	Nickel			Potassium			Selenium			Silicon			Silver			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
A-11	J1PXK0	8/15/12	8.16		3.42	762		342	0.256	U	0.256	466		1.71	0.171	U	0.171	163		42.7
Duplicate of J1PXK0	J1PXK2	8/15/12	8.58		3.34	872		334	0.250	U	0.250	481		1.67	0.167	U	0.167	130		41.7
A-1	J1PXJ0	8/15/12	8.86		3.36	918		336	0.252	U	0.252	473		1.68	0.168	U	0.168	204		42.0
A-2	J1PXJ1	8/15/12	10.9		3.58	1650		358	0.268	U	0.268	305		1.79	0.179	U	0.179	211		44.7
A-3	J1PXJ2	8/15/12	12.9		3.26	1240		326	0.245	U	0.245	713		1.63	0.163	U	0.163	322		40.8
A-4	J1PXJ3	8/15/12	8.99		3.20	751		320	0.240	U	0.240	411		1.60	0.160	U	0.160	303		40.0
A-5	J1PXJ4	8/15/12	11.5		3.21	1630		321	0.241	U	0.241	842		1.61	0.161	U	0.161	215		40.1
A-6	J1PXJ5	8/15/12	7.14		2.87	501		287	0.215	U	0.215	308		1.43	0.143	U	0.143	378		35.8
A-7	J1PXJ6	8/15/12	11.8		3.95	956		395	0.297	U	0.297	610		1.98	0.198	U	0.198	265		49.4
A-8	J1PXJ7	8/15/12	9.60		2.92	903		292	0.219	U	0.219	450		1.46	0.146	U	0.146	221		36.5
A-9	J1PXJ8	8/15/12	9.61		3.67	1210		367	0.275	U	0.275	979		1.83	0.183	U	0.183	288		45.8
A-10	J1PXJ9	8/15/12	10.3		3.93	1060		393	0.294	U	0.294	523		1.96	0.196	U	0.196	219		49.1
A-12	J1PXK1	8/15/12	8.42		2.83	711		283	0.212	U	0.212	487		1.42	0.142	U	0.142	194		35.4
B-8	J1PXL0	8/16/12	9.41		3.68	1000		368	0.276	U	0.276	379		1.84	0.184	U	0.184	256		46.0
Duplicate of J1PXL0	J1PXL5	8/16/12	9.78		3.89	918		389	0.292	U	0.292	351		1.94	0.194	U	0.194	268		48.6
B-1	J1PXK3	8/16/12	14.2		3.40	1130		340	0.255	U	0.255	500		1.70	0.170	U	0.170	328		42.5
B-2	J1PXK4	8/16/12	9.86		3.76	903		376	0.282	U	0.282	364		1.88	0.188	U	0.188	246		47.0
B-3	J1PXK5	8/16/12	8.79		3.79	846		379	0.284	U	0.284	364		1.89	0.189	U	0.189	237		47.3
B-4	J1PXK6	8/16/12	9.40		3.71	810		371	0.278	U	0.278	343		1.85	0.185	U	0.185	278		46.4
B-5	J1PXK7	8/16/12	9.51		3.87	932		387	0.290	U	0.290	402		1.93	0.193	U	0.193	331		48.3
B-6	J1PXK8	8/16/12	9.44		3.41	816		341	0.255	U	0.255	166		1.70	0.170	U	0.170	255		42.6
B-7	J1PXK9	8/16/12	9.18		3.74	918		374	0.281	U	0.281	415		1.87	0.187	U	0.187	210		46.8
B-9	J1PXL1	8/16/12	10.5		3.95	1480		395	0.296	U	0.296	601		1.97	0.197	U	0.197	295		49.4
B-10	J1PXL2	8/16/12	9.03		3.86	1120		386	0.289	U	0.289	492		1.93	0.193	U	0.193	292		48.2
B-11	J1PXL3	8/16/12	8.97		3.40	1070		340	0.255	U	0.255	520		1.70	0.170	U	0.170	285		42.6
B-12	J1PXL4	8/16/12	9.36		3.90	1080		390	0.292	U	0.292	473		1.95	0.195	U	0.195	232		48.7
Equipment Blank	J1PXL6	8/16/12	3.39	U	3.39	43	B	339	0.254	U	0.254	102		1.70	0.170	U	0.170	42.4	U	42.4

Attachment	1	Sheet No.	8 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Metals).

LOCATION	HEIS Number	Sample Date	Vanadium mg/kg	Vanadium Q	Vanadium PQL	Zinc mg/kg	Zinc Q	Zinc PQL
A-11	J1PXK0	8/15/12	33.4		2.14	33.2		8.55
Duplicate of J1PXK0	J1PXK2	8/15/12	23.8		2.09	28.8		8.35
A-1	J1PXJ0	8/15/12	26.8		2.10	25.5		8.39
A-2	J1PXJ1	8/15/12	38.3		2.23	36.0		8.94
A-3	J1PXJ2	8/15/12	49.8		2.04	39.6		8.16
A-4	J1PXJ3	8/15/12	62.8		2.00	42.5		8.00
A-5	J1PXJ4	8/15/12	47.3		2.01	45.0		8.03
A-6	J1PXJ5	8/15/12	60.6		1.79	39.0		7.17
A-7	J1PXJ6	8/15/12	43.5		2.47	42.3		9.89
A-8	J1PXJ7	8/15/12	33.1		1.82	32.3		7.30
A-9	J1PXJ8	8/15/12	47.9		2.29	42.9		9.16
A-10	J1PXJ9	8/15/12	31.4		2.45	32.4		9.81
A-12	J1PXK1	8/15/12	44.0		1.77	34.9		7.08
B-8	J1PXL0	8/16/12	36.2		2.30	30.1		9.20
Duplicate of J1PXL0	J1PXL5	8/16/12	35.9		2.43	29.7		9.72
B-1	J1PXK3	8/16/12	42.2		2.12	34.7		8.50
B-2	J1PXK4	8/16/12	40.3		2.35	32.0		9.40
B-3	J1PXK5	8/16/12	43.4		2.37	33.8		9.46
B-4	J1PXK6	8/16/12	39.7		2.32	30.6		9.27
B-5	J1PXK7	8/16/12	39.6		2.42	30.6		9.67
B-6	J1PXK8	8/16/12	48.6		2.13	35.1		8.52
B-7	J1PXK9	8/16/12	42.3		2.34	33.8		9.36
B-9	J1PXL1	8/16/12	52.5		2.47	43.5		9.87
B-10	J1PXL2	8/16/12	56.9		2.41	43.1		9.64
B-11	J1PXL3	8/16/12	55.1		2.13	37.9		8.51
B-12	J1PXL4	8/16/12	38.5		2.44	36.4		9.74
Equipment Blank	J1PXL6	8/16/12	0.273	B	2.12	1.2	B	8.48

Attachment	1	Sheet No.	9 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Anions).

LOCATION	HEIS Number	Sample Date	Bromide			Chloride			Fluoride			Nitrate			Nitrite			Nitrogen in Nitrite and Nitrate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
A-11	J1PXK0	8/15/12	1.0	U	1.0	1.0	U	1.0	1.0	U	1.0	1.0	URJ	1.0	1.0	UR	1.0	0.24	B	0.10
Duplicate of J1PXK0	J1PXK2	8/15/12	1.0	U	1.0	3.6	B	1.0	1.0	U	1.0	2.4	JB	1.0	1.0	UR	1.0	0.61		0.08
A-1	J1PXJ0	8/15/12	0.9	U	0.9	1.0	B	0.9	0.9	U	0.9	0.9	JB	0.9	0.9	UR	0.9	0.40	B	0.09
A-2	J1PXJ1	8/15/12	1.0	U	1.0	4.9		1.0	1.0	U	1.0	15.8	J	1.0	1.0	UR	1.0	3.53		0.10
A-3	J1PXJ2	8/15/12	1.1	B	1.0	127	D	2.1	1.0	U	1.0	32.2	J	1.0	1.0	UR	1.0	7.18		0.10
A-4	J1PXJ3	8/15/12	0.9	U	0.9	5.7		0.9	0.9	U	0.9	3.7	JB	0.9	0.9	UR	0.9	0.86		0.09
A-5	J1PXJ4	8/15/12	1.0	U	1.0	1.1	B	1.0	1.0	U	1.0	25.8	J	1.0	1.0	UR	1.0	5.58		0.10
A-6	J1PXJ5	8/15/12	0.9	U	0.9	8.1		0.9	0.9	U	0.9	8.6	J	0.9	0.9	UR	0.9	1.90		0.09
A-7	J1PXJ6	8/15/12	0.9	U	0.9	48.7		0.9	0.9	U	0.9	112	JD	4.7	0.9	UR	0.9	25.0	D	0.47
A-8	J1PXJ7	8/15/12	0.9	U	0.9	0.9	B	0.9	0.9	U	0.9	18.0	J	0.9	0.9	UR	0.9	3.97		0.09
A-9	J1PXJ8	8/15/12	1.0	U	1.0	1.1	B	1.0	1.0	U	1.0	4.0	JB	1.0	1.0	UR	1.0	0.84		0.10
A-10	J1PXJ9	8/15/12	0.9	U	0.9	1.4	B	0.9	0.9	U	0.9	6.2	J	0.9	0.9	UR	0.9	1.28		0.09
A-12	J1PXK1	8/15/12	0.9	U	0.9	14.3		0.9	0.9	U	0.9	46.1	J	0.9	0.9	UR	0.9	9.91	D	0.18
B-8	J1PXL0	8/16/12	1.0	U	1.0	4.1	B	1.0	2.8	B	1.0	8.1	J	1.0	1.0	U	1.0	1.28		0.10
Duplicate of J1PXL0	J1PXL5	8/16/12	1.0	U	1.0	1.0	B	1.0	1.0	U	1.0	5.1	J	1.0	1.0	U	1.0	0.97		0.10
B-1	J1PXK3	8/16/12	0.9	U	0.9	9.3		0.9	0.9	U	0.9	53.9	J	0.9	0.9	U	0.9	12.2	D	0.50
B-2	J1PXK4	8/16/12	0.9	U	0.9	1.8	B	0.9	0.9	U	0.9	11.6	J	0.9	0.9	U	0.9	13.4	D	0.20
B-3	J1PXK5	8/16/12	1.0	U	1.0	1.3	B	1.0	1.0	U	1.0	4.8	J	1.0	1.0	U	1.0	1.01		0.10
B-4	J1PXK6	8/16/12	1.0	U	1.0	2.1	B	1.0	1.0	U	1.0	10.8	J	1.0	1.0	U	1.0	2.06		0.10
B-5	J1PXK7	8/16/12	1.0	U	1.0	2.5	B	1.0	1.0	U	1.0	7.1	J	1.0	1.0	U	1.0	1.91		0.10
B-6	J1PXK8	8/16/12	1.0	U	1.0	1.1	B	1.0	1.0	U	1.0	14.2	J	1.0	1.0	U	1.0	3.12		0.09
B-7	J1PXK9	8/16/12	1.0	U	1.0	2.0	B	1.0	1.0	U	1.0	19.6	J	1.0	1.0	U	1.0	4.17		0.10
B-9	J1PXL1	8/16/12	1.0	U	1.0	3.2	B	1.0	1.1	B	1.0	51.3	J	1.0	1.0	U	1.0	11.1	D	0.19
B-10	J1PXL2	8/16/12	1.0	U	1.0	8.7		1.0	1.0	U	1.0	34.8	J	1.0	1.0	U	1.0	7.05		0.10
B-11	J1PXL3	8/16/12	1.0	U	1.0	8.7		1.0	1.0	U	1.0	62.7	J	1.0	1.0	U	1.0	14.0	D	0.47
B-12	J1PXL4	8/16/12	1.0	U	1.0	7.2		1.0	1.0	U	1.0	43.8	J	1.0	1.0	U	1.0	8.69		0.10

Attachment	1	Sheet No.	10 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Anions).

LOCATION	HEIS Number	Sample Date	Orthophosphate			Sulfate			Percent Solids			pH Measurement		
			mg/kg	Q	PQL	mg/kg	Q	PQL	%	Q	PQL	pH	Q	PQL
A-11	J1PXK0	8/15/12	2.0	UR	2.0	6.6		1.0	95.9		0.1	8.91	J	0.10
Duplicate of J1PXK0	J1PXK2	8/15/12	2.1	UR	2.1	22.4		1.0	96.6		0.1	8.88	J	0.10
A-1	J1PXJ0	8/15/12	1.9	UR	1.9	9.3		0.9	94.5		0.1	9.91	J	0.10
A-2	J1PXJ1	8/15/12	3.7	JB	1.9	21.5		1.0	99.9		0.1	8.68	J	0.10
A-3	J1PXJ2	8/15/12	2.2	JB	2.1	937		1.0	98.8		0.1	8.15	J	0.10
A-4	J1PXJ3	8/15/12	1.8	UR	1.8	10.3		0.9	99.2		0.1	9.08	J	0.10
A-5	J1PXJ4	8/15/12	5.0	JB	1.9	25.2		1.0	98.9		0.1	8.61	J	0.10
A-6	J1PXJ5	8/15/12	1.9	UR	1.9	210		0.9	99.6		0.1	8.87	J	0.10
A-7	J1PXJ6	8/15/12	1.9	UR	1.9	185	D	4.7	93.7		0.1	8.26	J	0.10
A-8	J1PXJ7	8/15/12	1.9	UR	1.9	26.6		0.9	99.3		0.1	8.93	J	0.10
A-9	J1PXJ8	8/15/12	4.3	JB	2.0	7.3		1.0	99.2		0.1	9.01	J	0.10
A-10	J1PXJ9	8/15/12	1.9	UR	1.9	16.2		0.9	99.9		0.1	9.09	J	0.10
A-12	J1PXK1	8/15/12	1.8	JB	1.8	204		0.9	99.5		0.1	8.49	J	0.10
B-8	J1PXL0	8/16/12	1.9	U	1.9	6.5		1.0	98.8		0.1	9.29		0.10
Duplicate of J1PXL0	J1PXL5	8/16/12	1.9	U	1.9	4.1	B	1.0	98.9		0.1	9.12		0.10
B-1	J1PXK3	8/16/12	1.8	U	1.8	89.1		0.9	99.7		0.1	8.95		0.10
B-2	J1PXK4	8/16/12	1.9	U	1.9	27.0		0.9	98.5		0.1	9.23		0.10
B-3	J1PXK5	8/16/12	2.0	U	2.0	13.0		1.0	99.7		0.1	9.10		0.10
B-4	J1PXK6	8/16/12	1.9	U	1.9	38.4		1.0	99.9		0.1	9.11		0.10
B-5	J1PXK7	8/16/12	2.0	U	2.0	60.4		1.0	99.5		0.1	9.19		0.10
B-6	J1PXK8	8/16/12	1.9	U	1.9	9.6		1.0	99.5		0.1	9.10		0.10
B-7	J1PXK9	8/16/12	2.5	B	2.0	15.5		1.0	98.9		0.1	9.11		0.10
B-9	J1PXL1	8/16/12	3.5	B	2.0	25.7		1.0	99.3		0.1	8.86		0.10
B-10	J1PXL2	8/16/12	5.0	B	1.9	33.9		1.0	99.8		0.1	8.76		0.10
B-11	J1PXL3	8/16/12	5.2	B	2.0	36.2		1.0	99.6		0.1	9.13		0.10
B-12	J1PXL4	8/16/12	2.0	U	2.0	35.1		1.0	98.7		0.1	8.90		0.10
Equipment Blank	J1PXL6	8/16/12							100		0.1			

Attachment	1	Sheet No.	11 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-11 - J1PXK0			Duplicate of J1PXK0 J1PXK2			A-1 - J1PXJ0			A-2 - J1PXJ1			A-3 - J1PXJ2		
		8/15/12			8/15/12			8/15/12			8/15/12			8/15/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.33	U	3.33	3.34	U	3.34
Acenaphthylene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.33	U	3.33	10.9		3.34
Anthracene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.33	U	3.33	10.8		3.34
Benzo(a)anthracene	PAH	1.98	J	3.42	1.13	J	3.43	3.51	U	3.51	9.71		3.33	113		3.34
Benzo(a)pyrene	PAH	1.28	J	3.42	3.43	U	3.43	3.51	U	3.51	6.19		3.33	69.5		3.34
Benzo(b)fluoranthene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	5.84		3.33	58.6		3.34
Benzo(ghi)perylene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	5.76		3.33	47.2		3.34
Benzo(k)fluoranthene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	2.60	J	3.33	28.9		3.34
Chrysene	PAH	15.0	U	3.42	15.0	U	3.43	3.51	U	3.51	7.22		3.33	111		3.34
Dibenz[a,h]anthracene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.33	U	3.33	6.74		3.34
Fluoranthene	PAH	1.92	J	3.42	1.19	J	3.43	3.51	U	3.51	11.5		3.33	155		3.34
Fluorene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.33	U	3.33	3.34	U	3.34
Indeno(1,2,3-cd)pyrene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	6.52		3.33	35.3		3.34
Naphthalene	PAH	1.39	J	3.42	3.43	U	3.43	3.51	U	3.51	8.94		3.33	119		3.34
Phenanthrene	PAH	3.42	U	3.42	3.43	U	3.43	3.51	U	3.51	3.17	J	3.33	46.9		3.34
Pyrene	PAH	2.09	J	3.42	1.24	J	3.43	3.51	U	3.51	9.94		3.33	132		3.34
Aroclor-1016	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1221	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1232	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1242	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1248	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1254	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1260	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1262	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aroclor-1268	PCB	13.5	U	13.5	13.3	U	13.3	13.7	U	13.7	13.0	U	13.0	13.0	U	13.0
Aldrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Alpha-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
alpha-Chlordane	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
beta-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Delta-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
4-4'-DDD	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
4-4'-DDE	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
4-4'-DDT	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Dieldrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endosulfan I	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endosulfan II	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endosulfan sulfate	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endrin aldehyde	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Endrin ketone	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Gamma-BHC (Lindane)	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
gamma-Chlordane	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Heptachlor	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Heptachlor epoxide	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Methoxychlor	PEST	1.34	UD	1.34	1.32	UD	1.32	1.36	UD	1.36	1.29	UD	1.29	1.29	UD	1.29
Toxaphene	PEST	13.4	UJD	13.4	13.2	UJD	13.2	13.6	UJD	13.6	12.9	UJD	12.9	12.9	UJD	12.9

Attachment	1	Sheet No.	12 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-4 - J1PXJ3			A-5 - J1PXJ4			A-6 - J1PXJ5			A-7 - J1PXJ6			A-8 - J1PXJ7		
		8/15/12			8/15/12			8/15/12			8/15/12			8/15/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	15.1		3.45	3.33	U	3.33
Acenaphthylene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	44.5		3.45	3.33	U	3.33
Anthracene	PAH	3.27	U	3.27	9.80		3.34	3.28	U	3.28	3.45	U	3.45	3.33	U	3.33
Benzo(a)anthracene	PAH	3.27	U	3.27	3.16	J	3.34	3.28	U	3.28	9.31		3.45	4.42		3.33
Benzo(a)pyrene	PAH	3.27	U	3.27	1.09	J	3.34	3.28	U	3.28	5.91		3.45	2.17	J	3.33
Benzo(b)fluoranthene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	7.05		3.45	2.40	J	3.33
Benzo(ghi)perylene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	5.77		3.45	2.34	J	3.33
Benzo(k)fluoranthene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	2.90	J	3.45	1.15	J	3.33
Chrysene	PAH	3.27	U	3.27	15.0	U	3.34	3.28	U	3.28	7.53		3.45	15.0	U	3.33
Dibenz[a,h]anthracene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	3.45	U	3.45	3.33	U	3.33
Fluoranthene	PAH	3.27	U	3.27	10.4		3.34	3.28	U	3.28	10.1		3.45	5.24		3.33
Fluorene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	3.45	U	3.45	3.33	U	3.33
Indeno(1,2,3-cd)pyrene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	3.82		3.45	3.33	U	3.33
Naphthalene	PAH	3.27	U	3.27	1.97	J	3.34	3.28	U	3.28	4.86		3.45	4.71		3.33
Phenanthrene	PAH	3.27	U	3.27	3.34	U	3.34	3.28	U	3.28	1.52	J	3.45	1.52	J	3.33
Pyrene	PAH	3.27	U	3.27	0.970	J	3.34	3.28	U	3.28	10.1		3.45	5.04		3.33
Aroclor-1016	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1221	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1232	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1242	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1248	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1254	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1260	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1262	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aroclor-1268	PCB	13.0	U	13.0	13.4	U	13.4	13.3	U	13.3	13.9	U	13.9	13.2	U	13.2
Aldrin	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Alpha-BHC	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
alpha-Chlordane	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
beta-BHC	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Delta-BHC	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
4-4'-DDD	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
4-4'-DDE	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
4-4'-DDT	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Dieldrin	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endosulfan I	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endosulfan II	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endosulfan sulfate	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endrin	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endrin aldehyde	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Endrin ketone	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Gamma-BHC (Lindane)	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
gamma-Chlordane	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Heptachlor	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Heptachlor epoxide	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Methoxychlor	PEST	1.29	UD	1.29	1.33	UD	1.33	1.32	UD	1.32	1.38	UD	1.38	1.31	UD	1.31
Toxaphene	PEST	12.9	UJD	12.9	13.3	UJD	13.3	13.2	UJD	13.2	13.8	UJD	13.8	13.1	UJD	13.1

Attachment	1	Sheet No.	13 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-9 - J1PXJ8			A-10 - J1PXJ9			A-12 - J1PXK1			B-8 - J1PXL0			Duplicate of J1PXL0 - J1PXL5		
		8/15/12			8/15/12			8/15/12			8/16/12			8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.28	U	3.28	19.0		3.3	2.51	J	3.33	3.33	U	3.33	4.80		3.16
Acenaphthylene	PAH	22.1		3.28	3.30	U	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Anthracene	PAH	3.28	U	3.28	3.30	U	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Benzo(a)anthracene	PAH	3.28	U	3.28	9.42		3.3	3.25	J	3.33	3.33	U	3.33	3.16	U	3.16
Benzo(a)pyrene	PAH	3.28	U	3.28	3.87		3.3	1.92	J	3.33	3.33	U	3.33	3.16	U	3.16
Benzo(b)fluoranthene	PAH	3.28	U	3.28	6.45		3.3	1.67	J	3.33	3.33	U	3.33	3.16	U	3.16
Benzo(ghi)perylene	PAH	3.28	U	3.28	6.45		3.3	1.67	J	3.33	3.33	U	3.33	3.16	U	3.16
Benzo(k)fluoranthene	PAH	3.28	U	3.28	2.53	J	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Chrysene	PAH	3.28	U	3.28	8.12		3.3	15.0	U	3.33	3.33	U	3.33	3.16	U	3.16
Dibenz[a,h]anthracene	PAH	3.28	U	3.28	3.30	U	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Fluoranthene	PAH	3.28	U	3.28	14.2		3.3	3.10	J	3.33	3.33	U	3.33	3.16	U	3.16
Fluorene	PAH	3.28	U	3.28	3.30	U	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Indeno(1,2,3-cd)pyrene	PAH	1.35	J	3.28	2.78	J	3.3	1.58	J	3.33	3.33	U	3.33	3.16	U	3.16
Naphthalene	PAH	3.28	U	3.28	12.4		3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Phenanthrene	PAH	3.28	U	3.28	2.41	J	3.3	3.33	U	3.33	3.33	U	3.33	3.16	U	3.16
Pyrene	PAH	3.28	U	3.28	13.0		3.3	2.85	J	3.33	3.33	U	3.33	3.16	U	3.16
Aroclor-1016	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1221	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1232	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1242	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1248	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1254	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1260	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1262	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aroclor-1268	PCB	13.2	U	13.2	13.2	U	13.2	13.2	U	13.2	13.1	U	13.1	12.9	U	12.9
Aldrin	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Alpha-BHC	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
alpha-Chlordane	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
beta-BHC	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Delta-BHC	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
4-4'-DDD	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
4-4'-DDE	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
4-4'-DDT	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Dieldrin	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endosulfan I	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endosulfan II	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endosulfan sulfate	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endrin	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endrin aldehyde	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Endrin ketone	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Gamma-BHC (Lindane)	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
gamma-Chlordane	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Heptachlor	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Heptachlor epoxide	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Methoxychlor	PEST	1.31	UD	1.31	1.31	UD	1.31	1.31	UD	1.31	1.30	UD	1.30	1.28	UD	1.28
Toxaphene	PEST	13.1	UJD	13.1	13.1	UJD	13.1	13.1	UJD	13.1	13.0	UD	13.0	12.8	UD	12.8

Attachment	1	Sheet No.	14 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-1 - J1PXK3			B-2 - J1PXK4			B-3 - J1PXK5			B-4 - J1PXK6			B-5 - J1PXK7		
		8/16/12			8/16/12			8/16/12			8/16/12			8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.28	U	3.28	3.29	U	3.29	6.49	UD	6.49	3.26	U	3.26	3.32	U	3.32
Acenaphthylene	PAH	3.28	U	3.28	3.29	U	3.29	1320	D	6.49	3.26	U	3.26	3.32	U	3.32
Anthracene	PAH	3.28	U	3.28	3.29	U	3.29	6.49	UD	6.49	3.26	U	3.26	3.32	U	3.32
Benzo(a)anthracene	PAH	3.28	U	3.28	3.29	U	3.29	5.00	JD	6.49	1.01	J	3.26	3.32	U	3.32
Benzo(a)pyrene	PAH	3.28	U	3.28	3.29	U	3.29	4.55	JD	6.49	3.26	U	3.26	3.32	U	3.32
Benzo(b)fluoranthene	PAH	3.28	U	3.28	3.29	U	3.29	4.81	JD	6.49	3.26	U	3.26	3.32	U	3.32
Benzo(ghi)perylene	PAH	3.28	U	3.28	3.29	U	3.29	4.06	JD	6.49	3.26	U	3.26	3.32	U	3.32
Benzo(k)fluoranthene	PAH	3.28	U	3.28	3.29	U	3.29	6.49	UD	6.49	3.26	U	3.26	3.32	U	3.32
Chrysene	PAH	3.28	U	3.28	3.29	U	3.29	5.44	JD	6.49	3.26	U	3.26	0.863	J	3.32
Dibenz[a,h]anthracene	PAH	3.28	U	3.28	3.29	U	3.29	6.49	UD	6.49	3.26	U	3.26	3.32	U	3.32
Fluoranthene	PAH	3.28	U	3.28	3.29	U	3.29	16.7	D	6.49	3.26	U	3.26	3.32	U	3.32
Fluorene	PAH	3.28	U	3.28	3.29	U	3.29	9.78	D	6.49	3.26	U	3.26	3.32	U	3.32
Indeno(1,2,3-cd)pyrene	PAH	3.28	U	3.28	3.29	U	3.29	2.53	JD	6.49	3.26	U	3.26	3.32	U	3.32
Naphthalene	PAH	3.28	U	3.28	3.29	U	3.29	12.6	D	6.49	3.26	U	3.26	3.32	U	3.32
Phenanthrene	PAH	3.28	U	3.28	3.29	U	3.29	15.5	D	6.49	3.26	U	3.26	3.32	U	3.32
Pyrene	PAH	3.28	U	3.28	3.29	U	3.29	8.95	D	6.49	3.26	U	3.26	3.32	U	3.32
Aroclor-1016	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1221	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1232	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1242	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1248	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1254	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1260	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1262	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aroclor-1268	PCB	13.2	U	13.2	12.9	U	12.9	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1
Aldrin	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Alpha-BHC	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
alpha-Chlordane	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
beta-BHC	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Delta-BHC	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
4-4'-DDD	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
4-4'-DDE	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
4-4'-DDT	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Dieldrin	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endosulfan I	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endosulfan II	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endosulfan sulfate	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endrin	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endrin aldehyde	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Endrin ketone	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Gamma-BHC (Lindane)	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
gamma-Chlordane	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Heptachlor	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Heptachlor epoxide	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Methoxychlor	PEST	1.31	UD	1.31	1.28	UD	1.28	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30
Toxaphene	PEST	13.1	UD	13.1	12.8	UD	12.8	13.2	UD	13.2	13.2	UD	13.2	13.0	UD	13.0

Attachment	1	Sheet No.	15 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-6 - J1PXK8			B-7 - J1PXK9			B-9 - J1PXL1			B-10 - J1PXL2			B-11 - J1PXL3		
		8/16/12			8/16/12			8/16/12			8/16/12			8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.30	U	3.30	3.29	U	3.29	11.4		3.33	3.32	U	3.32	3.33	U	3.33
Acenaphthylene	PAH	3.30	U	3.30	3.29	U	3.29	6.87		3.33	3.32	U	3.32	1.83	J	3.33
Anthracene	PAH	3.30	U	3.30	3.29	U	3.29	3.33	U	3.33	3.32	U	3.32	3.33	U	3.33
Benzo(a)anthracene	PAH	3.47		3.30	1.04	J	3.29	1.40	J	3.33	14.5		3.32	8.22		3.33
Benzo(a)pyrene	PAH	3.30	U	3.30	3.29	U	3.29	3.33	U	3.33	10.5		3.32	4.93		3.33
Benzo(b)fluoranthene	PAH	2.66	J	3.30	3.29	U	3.29	1.02	J	3.33	10.4		3.32	6.42		3.33
Benzo(ghi)perylene	PAH	2.81	J	3.30	3.29	U	3.29	0.884	J	3.33	8.18		3.32	5.84		3.33
Benzo(k)fluoranthene	PAH	1.07	J	3.30	3.29	U	3.29	3.33	U	3.33	4.51		3.32	2.10	J	3.33
Chrysene	PAH	3.50		3.30	0.973	J	3.29	1.40	J	3.33	11.9		3.32	6.26		3.33
Dibenz[a,h]anthracene	PAH	3.30	U	3.30	3.29	U	3.29	3.33	U	3.33	3.32	U	3.32	3.33	U	3.33
Fluoranthene	PAH	5.02		3.30	1.47	J	3.29	1.17	J	3.33	20.4		3.32	12.4		3.33
Fluorene	PAH	3.30	U	3.30	3.29	U	3.29	6.96		3.33	3.32	U	3.32	3.33	U	3.33
Indeno(1,2,3-cd)pyrene	PAH	1.72	J	3.30	1.52	J	3.29	3.33	U	3.33	6.94		3.32	6.18		3.33
Naphthalene	PAH	6.00		3.30	3.29	U	3.29	3.33	U	3.33	20.3		3.32	7.27		3.33
Phenanthrene	PAH	0.908	J	3.30	3.29	U	3.29	3.33	U	3.33	4.11		3.32	3.08	J	3.33
Pyrene	PAH	4.67		3.30	1.04	J	3.29	1.57	J	3.33	17.9		3.32	9.97		3.33
Aroclor-1016	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1221	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1232	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1242	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1248	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1254	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1260	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1262	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aroclor-1268	PCB	13.3	U	13.3	13.3	U	13.3	13.1	U	13.1	13.1	U	13.1	13.3	U	13.3
Aldrin	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Alpha-BHC	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
alpha-Chlordane	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
beta-BHC	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Delta-BHC	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
4-4'-DDD	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
4-4'-DDE	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
4-4'-DDT	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Dieldrin	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endosulfan I	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endosulfan II	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endosulfan sulfate	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endrin	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endrin aldehyde	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Endrin ketone	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Gamma-BHC (Lindane)	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
gamma-Chlordane	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Heptachlor	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Heptachlor epoxide	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Methoxychlor	PEST	1.32	UD	1.32	1.32	UD	1.32	1.30	UD	1.30	1.30	UD	1.30	1.32	UD	1.32
Toxaphene	PEST	13.2	UD	13.2	13.2	UD	13.2	13.0	UD	13.0	13.0	UD	13.0	13.2	UD	13.2

Attachment	1	Sheet No.	16 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-12 - J1PXL4			Equipment Blank - J1PXL6		
		8/16/12			8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.34	U	3.34	3.31	U	3.31
Acenaphthylene	PAH	3.34	U	3.34	3.31	U	3.31
Anthracene	PAH	3.34	U	3.34	3.31	U	3.31
Benzo(a)anthracene	PAH	5.61		3.34	3.31	U	3.31
Benzo(a)pyrene	PAH	4.31		3.34	3.31	U	3.31
Benzo(b)fluoranthene	PAH	5.31		3.34	3.31	U	3.31
Benzo(ghi)perylene	PAH	3.34		3.34	3.31	U	3.31
Benzo(k)fluoranthene	PAH	2.00	J	3.34	3.31	U	3.31
Chrysene	PAH	6.28		3.34	3.31	U	3.31
Dibenz[a,h]anthracene	PAH	3.34	U	3.34	3.31	U	3.31
Fluoranthene	PAH	9.78		3.34	3.31	U	3.31
Fluorene	PAH	3.34	U	3.34	3.31	U	3.31
Indeno(1,2,3-cd)pyrene	PAH	3.82		3.34	3.31	U	3.31
Naphthalene	PAH	6.31		3.34	3.31	U	3.31
Phenanthrene	PAH	2.05	J	3.34	3.31	U	3.31
Pyrene	PAH	8.43		3.34	3.31	U	3.31
Aroclor-1016	PCB	13.3	U	13.3			
Aroclor-1221	PCB	13.3	U	13.3			
Aroclor-1232	PCB	13.3	U	13.3			
Aroclor-1242	PCB	13.3	U	13.3			
Aroclor-1248	PCB	13.3	U	13.3			
Aroclor-1254	PCB	13.3	U	13.3			
Aroclor-1260	PCB	13.3	U	13.3			
Aroclor-1262	PCB	13.3	U	13.3			
Aroclor-1268	PCB	13.3	U	13.3			
Aldrin	PEST	1.32	UD	1.32			
Alpha-BHC	PEST	1.32	UD	1.32			
alpha-Chlordane	PEST	1.32	UD	1.32			
beta-BHC	PEST	1.32	UD	1.32			
Delta-BHC	PEST	1.32	UD	1.32			
4-4'-DDD	PEST	1.32	UD	1.32			
4-4'-DDE	PEST	1.32	UD	1.32			
4-4'-DDT	PEST	1.32	UD	1.32			
Dieldrin	PEST	1.32	UD	1.32			
Endosulfan I	PEST	1.32	UD	1.32			
Endosulfan II	PEST	1.32	UD	1.32			
Endosulfan sulfate	PEST	1.32	UD	1.32			
Endrin	PEST	1.32	UD	1.32			
Endrin aldehyde	PEST	1.32	UD	1.32			
Endrin ketone	PEST	1.32	UD	1.32			
Gamma-BHC (Lindane)	PEST	1.32	UD	1.32			
gamma-Chlordane	PEST	1.32	UD	1.32			
Heptachlor	PEST	1.32	UD	1.32			
Heptachlor epoxide	PEST	1.32	UD	1.32			
Methoxychlor	PEST	1.32	UD	1.32			
Toxaphene	PEST	13.2	UD	13.2			

Attachment	1	Sheet No.	17 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-11 - J1PXK0			Duplicate of J1PXK0 J1PXK2			A-1 - J1PXJ0			A-2 - J1PXJ1			A-3 - J1PXJ2		
		8/15/12			8/15/12			8/15/12			8/15/12			8/15/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
1,2-Dichlorobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
1,3-Dichlorobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
1,4-Dichlorobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2,4,5-Trichlorophenol	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
2,4,6-Trichlorophenol	SVOA	354	UJ	354	331	UJ	331	349	UJ	349	339	UJ	339	330	UJ	330
2,4-Dichlorophenol	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
2,4-Dimethylphenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2,4-Dinitrophenol	SVOA	1770	U	1770	1650	U	1650	1750	U	1750	1690	U	1690	1650	U	1650
2,4-Dinitrotoluene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2,6-Dinitrotoluene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2-Chloronaphthalene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2-Chlorophenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2-Methylnaphthalene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2-Methylphenol (cresol, o-)	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
2-Nitroaniline	SVOA	1770	U	1770	1650	U	1650	1750	U	1750	1690	U	1690	1650	U	1650
2-Nitrophenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
3+4 Methylphenol (cresol, m+p)	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
3,3'-Dichlorobenzidine	SVOA	709	U	709	661	U	661	698	U	698	677	U	677	660	U	660
3-Nitroaniline	SVOA	1770	U	1770	1650	U	1650	1750	U	1750	1690	U	1690	1650	U	1650
4,6-Dinitro-2-methylphenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
4-Bromophenylphenyl ether	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
4-Chloro-3-methylphenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
4-Chloroanaline	SVOA	354	UJ	354	331	UJ	331	349	UJ	349	339	UJ	339	330	UJ	330
4-Chlorophenylphenyl ether	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
4-Nitroaniline	SVOA	1770	U	1770	1650	U	1650	1750	U	1750	1690	U	1690	1650	U	1650
4-Nitrophenol	SVOA	1770	UJ	1770	1650	UJ	1650	1750	UJ	1750	1690	UJ	1690	1650	UJ	1650
Acenaphthene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Acenaphthylene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Anthracene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Benzo(a)anthracene	SVOA	354	U	354	331	U	331	349	U	349	57.8	J	339	70.6	J	330
Benzo(a)pyrene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Benzo(b)fluoranthene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	50	J	330
Benzo(ghi)perylene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Benzo(k)fluoranthene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	60.2	J	330
Bis(2-chloro-1-methylethyl)ether	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
Bis(2-Chloroethoxy)methane	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
Bis(2-chloroethyl) ether	SVOA	354	U	354	331	UJ	331	349	U	349	339	U	339	330	U	330
Bis(2-ethylhexyl) phthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Butylbenzylphthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Carbazole	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Chrysene	SVOA	354	U	354	331	U	331	349	U	349	82.8	J	339	101	J	330
Di-n-butylphthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Di-n-octylphthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Dibenz[a,h]anthracene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Dibenzofuran	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Diethyl phthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Dimethyl phthalate	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Fluoranthene	SVOA	354	U	354	331	U	331	349	U	349	122	J	339	85.2	J	330
Fluorene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Hexachlorobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Hexachlorobutadiene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Hexachlorocyclopentadiene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Hexachloroethane	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Indeno(1,2,3-cd)pyrene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Isophorone	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
N-Nitroso-di-n-dipropylamine	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
N-Nitrosodiphenylamine	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Naphthalene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Nitrobenzene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Pentachlorophenol	SVOA	1770	U	1770	1650	UJ	1650	1750	U	1750	1690	U	1690	1650	U	1650
Phenanthrene	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Phenol	SVOA	354	U	354	331	U	331	349	U	349	339	U	339	330	U	330
Pyrene	SVOA	354	U	354	331	U	331	349	U	349	123	J	339	112	J	330

Attachment	1	Sheet No.	18 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-4 - J1PXJ3 8/15/12			A-5 - J1PXJ4 8/15/12			A-6 - J1PXJ5 8/15/12			A-7 - J1PXJ6 8/15/12			A-8 - J1PXJ7 8/15/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
1,2-Dichlorobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
1,3-Dichlorobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
1,4-Dichlorobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2,4,5-Trichlorophenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2,4,6-Trichlorophenol	SVOA	329	UJ	329	325	UJ	325	330	UJ	330	340	UJ	340	327	UJ	327
2,4-Dichlorophenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2,4-Dimethylphenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2,4-Dinitrophenol	SVOA	1650	U	1650	1620	U	1620	1650	U	1650	1700	U	1700	1640	U	1640
2,4-Dinitrotoluene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2,6-Dinitrotoluene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2-Chloronaphthalene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2-Chlorophenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2-Methylnaphthalene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2-Methylphenol (cresol, o-)	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
2-Nitroaniline	SVOA	1650	U	1650	1620	U	1620	1650	U	1650	1700	U	1700	1640	U	1640
2-Nitrophenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
3+4 Methylphenol (cresol, m+p)	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
3,3'-Dichlorobenzidine	SVOA	659	U	659	649	U	649	661	U	661	680	U	680	655	U	655
3-Nitroaniline	SVOA	1650	U	1650	1620	U	1620	1650	U	1650	1700	U	1700	1640	U	1640
4,6-Dinitro-2-methylphenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
4-Bromophenylphenyl ether	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
4-Chloro-3-methylphenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
4-Chloroanaline	SVOA	329	UJ	329	325	UJ	325	330	UJ	330	340	UJ	340	327	UJ	327
4-Chlorophenylphenyl ether	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
4-Nitroaniline	SVOA	1650	U	1650	1620	U	1620	1650	U	1650	1700	U	1700	1640	U	1640
4-Nitrophenol	SVOA	1650	UJ	1650	1620	UJ	1620	1650	UJ	1650	1700	UJ	1700	1640	UJ	1640
Acenaphthene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Acenaphthylene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Anthracene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Benzo(a)anthracene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Benzo(a)pyrene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Benzo(b)fluoranthene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Benzo(ghi)perylene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Benzo(k)fluoranthene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Bis(2-chloro-1-methylethyl)ether	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Bis(2-Chloroethoxy)methane	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Bis(2-chloroethyl) ether	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Bis(2-ethylhexyl) phthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Butylbenzylphthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Carbazole	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Chrysene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Di-n-butylphthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Di-n-octylphthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Dibenz[a,h]anthracene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Dibenzofuran	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Diethyl phthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Dimethyl phthalate	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Fluoranthene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Fluorene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Hexachlorobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Hexachlorobutadiene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Hexachlorocyclopentadiene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Hexachloroethane	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Indeno(1,2,3-cd)pyrene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Isophorone	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
N-Nitroso-di-n-dipropylamine	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
N-Nitrosodiphenylamine	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Naphthalene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Nitrobenzene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Pentachlorophenol	SVOA	1650	U	1650	1620	U	1620	1650	U	1650	1700	U	1700	1640	U	1640
Phenanthrene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Phenol	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327
Pyrene	SVOA	329	U	329	325	U	325	330	U	330	340	U	340	327	U	327

Attachment	1	Sheet No.	19 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	A-9 - J1PXJ8			A-10 - J1PXJ9			A-12 - J1PXK1			B-8 - J1PXL0			Duplicate of J1PXL0 - J1PXL5		
		8/15/12			8/15/12			8/15/12			8/16/12			8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
1,2-Dichlorobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
1,3-Dichlorobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
1,4-Dichlorobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2,4,5-Trichlorophenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2,4,6-Trichlorophenol	SVOA	330	UJ	330	330	UJ	330	321	UJ	321	328	U	328	329	U	329
2,4-Dichlorophenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2,4-Dimethylphenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2,4-Dinitrophenol	SVOA	1650	U	1650	1650	U	1650	1610	U	1610	1640	U	1640	1650	U	1650
2,4-Dinitrotoluene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2,6-Dinitrotoluene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2-Chloronaphthalene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2-Chlorophenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2-Methylnaphthalene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2-Methylphenol (cresol, o-)	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
2-Nitroaniline	SVOA	1650	U	1650	1650	U	1650	1610	U	1610	1640	U	1640	1650	U	1650
2-Nitrophenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
3+4 Methylphenol (cresol, m+p)	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
3,3'-Dichlorobenzidine	SVOA	659	U	659	661	U	661	642	U	642	655	U	655	658	U	658
3-Nitroaniline	SVOA	1650	U	1650	1650	U	1650	1610	U	1610	1640	U	1640	1650	U	1650
4,6-Dinitro-2-methylphenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
4-Bromophenylphenyl ether	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
4-Chloro-3-methylphenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
4-Chloroanaline	SVOA	330	UJ	330	330	UJ	330	321	UJ	321	328	U	328	329	U	329
4-Chlorophenylphenyl ether	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
4-Nitroaniline	SVOA	1650	U	1650	1650	U	1650	1610	U	1610	1640	U	1640	1650	U	1650
4-Nitrophenol	SVOA	1650	UJ	1650	1650	UJ	1650	1610	UJ	1610	1640	U	1640	1650	U	1650
Acenaphthene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Acenaphthylene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Anthracene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Benzo(a)anthracene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Benzo(a)pyrene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Benzo(b)fluoranthene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Benzo(ghi)perylene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Benzo(k)fluoranthene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Bis(2-chloro-1-methylethyl)ether	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Bis(2-Chloroethoxy)methane	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Bis(2-chloroethyl) ether	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Bis(2-ethylhexyl) phthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Butylbenzylphthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Carbazole	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Chrysene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Di-n-butylphthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Di-n-octylphthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Dibenz[a,h]anthracene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Dibenzofuran	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Diethyl phthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Dimethyl phthalate	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Fluoranthene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Fluorene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Hexachlorobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Hexachlorobutadiene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Hexachlorocyclopentadiene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Hexachloroethane	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Indeno(1,2,3-cd)pyrene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Isophorone	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
N-Nitroso-di-n-dipropylamine	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
N-Nitrosodiphenylamine	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Naphthalene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Nitrobenzene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Pentachlorophenol	SVOA	1650	U	1650	1650	U	1650	1610	U	1610	1640	U	1640	1650	U	1650
Phenanthrene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Phenol	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329
Pyrene	SVOA	330	U	330	330	U	330	321	U	321	328	U	328	329	U	329

Attachment	1	Sheet No.	20 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-1 - J1PXK3 8/16/12			B-2 - J1PXK4 8/16/12			B-3 - J1PXK5 8/16/12			B-4 - J1PXK6 8/16/12			B-5 - J1PXK7 8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
1,2-Dichlorobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
1,3-Dichlorobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
1,4-Dichlorobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,4,5-Trichlorophenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,4,6-Trichlorophenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,4-Dichlorophenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,4-Dimethylphenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,4-Dinitrophenol	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
2,4-Dinitrotoluene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2,6-Dinitrotoluene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2-Chloronaphthalene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2-Chlorophenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2-Methylnaphthalene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2-Methylphenol (cresol, o-)	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
2-Nitroaniline	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
2-Nitrophenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
3+4 Methylphenol (cresol, m+p)	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
3,3'-Dichlorobenzidine	SVOA	630	U	630	669	U	669	577	U	577	658	U	658	651	U	651
3-Nitroaniline	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
4,6-Dinitro-2-methylphenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
4-Bromophenylphenyl ether	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
4-Chloro-3-methylphenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
4-Chloroanaline	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
4-Chlorophenylphenyl ether	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
4-Nitroaniline	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
4-Nitrophenol	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
Acenaphthene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Acenaphthylene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Anthracene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Benzo(a)anthracene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Benzo(a)pyrene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Benzo(b)fluoranthene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Benzo(ghi)perylene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Benzo(k)fluoranthene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Bis(2-chloro-1-methylethyl)ether	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Bis(2-Chloroethoxy)methane	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Bis(2-chloroethyl) ether	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Bis(2-ethylhexyl) phthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Butylbenzylphthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Carbazole	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Chrysene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Di-n-butylphthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Di-n-octylphthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Dibenz[a,h]anthracene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Dibenzofuran	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Diethyl phthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Dimethyl phthalate	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Fluoranthene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Fluorene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Hexachlorobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Hexachlorobutadiene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Hexachlorocyclopentadiene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Hexachloroethane	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Indeno(1,2,3-cd)pyrene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Isophorone	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
N-Nitroso-di-n-dipropylamine	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
N-Nitrosodiphenylamine	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Naphthalene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Nitrobenzene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Pentachlorophenol	SVOA	1570	U	1570	1670	U	1670	1440	U	1440	1640	U	1640	1630	U	1630
Phenanthrene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Phenol	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325
Pyrene	SVOA	315	U	315	335	U	335	289	U	289	329	U	329	325	U	325

Attachment	1	Sheet No.	21 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-6 - J1PXK8 8/16/12			B-7 - J1PXK9 8/16/12			B-9 - J1PXL1 8/16/12			B-10 - J1PXL2 8/16/12			B-11 - J1PXL3 8/16/12		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
1,2-Dichlorobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
1,3-Dichlorobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
1,4-Dichlorobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,4,5-Trichlorophenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,4,6-Trichlorophenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,4-Dichlorophenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,4-Dimethylphenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,4-Dinitrophenol	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
2,4-Dinitrotoluene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2,6-Dinitrotoluene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2-Chloronaphthalene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2-Chlorophenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2-Methylnaphthalene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2-Methylphenol (cresol, o-)	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
2-Nitroaniline	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
2-Nitrophenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
3+4 Methylphenol (cresol, m+p)	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
3,3'-Dichlorobenzidine	SVOA	646	U	646	656	U	656	647	U	647	645	U	645	654	U	654
3-Nitroaniline	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
4,6-Dinitro-2-methylphenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
4-Bromophenylphenyl ether	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
4-Chloro-3-methylphenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
4-Chloroanaline	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
4-Chlorophenylphenyl ether	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
4-Nitroaniline	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
4-Nitrophenol	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
Acenaphthene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Acenaphthylene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Anthracene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Benzo(a)anthracene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Benzo(a)pyrene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Benzo(b)fluoranthene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Benzo(ghi)perylene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Benzo(k)fluoranthene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Bis(2-chloro-1-methylethyl)ether	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Bis(2-Chloroethoxy)methane	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Bis(2-chloroethyl) ether	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Bis(2-ethylhexyl) phthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Butylbenzylphthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Carbazole	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Chrysene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Di-n-butylphthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Di-n-octylphthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Dibenz[a,h]anthracene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Dibenzofuran	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Diethyl phthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Dimethyl phthalate	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Fluoranthene	SVOA	323	U	323	328	U	328	324	U	324	51.9	J	322	327	U	327
Fluorene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Hexachlorobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Hexachlorobutadiene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Hexachlorocyclopentadiene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Hexachloroethane	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Indeno(1,2,3-cd)pyrene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Isophorone	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
N-Nitroso-di-n-dipropylamine	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
N-Nitrosodiphenylamine	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Naphthalene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Nitrobenzene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Pentachlorophenol	SVOA	1620	U	1620	1640	U	1640	1620	U	1620	1610	U	1610	1630	U	1630
Phenanthrene	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Phenol	SVOA	323	U	323	328	U	328	324	U	324	322	U	322	327	U	327
Pyrene	SVOA	323	U	323	328	U	328	324	U	324	53.7	J	322	327	U	327

Attachment	1	Sheet No.	22 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

Attachment 1. 100-D-66 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	B-12 - J1PXL4		
		8/16/12		
		ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	331	U	331
1,2-Dichlorobenzene	SVOA	331	U	331
1,3-Dichlorobenzene	SVOA	331	U	331
1,4-Dichlorobenzene	SVOA	331	U	331
2,4,5-Trichlorophenol	SVOA	331	U	331
2,4,6-Trichlorophenol	SVOA	331	U	331
2,4-Dichlorophenol	SVOA	331	U	331
2,4-Dimethylphenol	SVOA	331	U	331
2,4-Dinitrophenol	SVOA	1650	U	1650
2,4-Dinitrotoluene	SVOA	331	U	331
2,6-Dinitrotoluene	SVOA	331	U	331
2-Chloronaphthalene	SVOA	331	U	331
2-Chlorophenol	SVOA	331	U	331
2-Methylnaphthalene	SVOA	331	U	331
2-Methylphenol (cresol, o-)	SVOA	331	U	331
2-Nitroaniline	SVOA	1650	U	1650
2-Nitrophenol	SVOA	331	U	331
3+4 Methylphenol (cresol, m+p)	SVOA	331	U	331
3,3'-Dichlorobenzidine	SVOA	662	U	662
3-Nitroaniline	SVOA	1650	U	1650
4,6-Dinitro-2-methylphenol	SVOA	331	U	331
4-Bromophenylphenyl ether	SVOA	331	U	331
4-Chloro-3-methylphenol	SVOA	331	U	331
4-Chloroanaline	SVOA	331	U	331
4-Chlorophenylphenyl ether	SVOA	331	U	331
4-Nitroaniline	SVOA	1650	U	1650
4-Nitrophenol	SVOA	1650	U	1650
Acenaphthene	SVOA	331	U	331
Acenaphthylene	SVOA	331	U	331
Anthracene	SVOA	331	U	331
Benzo(a)anthracene	SVOA	331	U	331
Benzo(a)pyrene	SVOA	331	U	331
Benzo(b)fluoranthene	SVOA	331	U	331
Benzo(ghi)perylene	SVOA	331	U	331
Benzo(k)fluoranthene	SVOA	331	U	331
Bis(2-chloro-1-methylethyl)ether	SVOA	331	U	331
Bis(2-Chloroethoxy)methane	SVOA	331	U	331
Bis(2-chloroethyl) ether	SVOA	331	U	331
Bis(2-ethylhexyl) phthalate	SVOA	331	U	331
Butylbenzylphthalate	SVOA	331	U	331
Carbazole	SVOA	331	U	331
Chrysene	SVOA	331	U	331
Di-n-butylphthalate	SVOA	331	U	331
Di-n-octylphthalate	SVOA	331	U	331
Dibenz[a,h]anthracene	SVOA	331	U	331
Dibenzofuran	SVOA	331	U	331
Diethyl phthalate	SVOA	331	U	331
Dimethyl phthalate	SVOA	331	U	331
Fluoranthene	SVOA	331	U	331
Fluorene	SVOA	331	U	331
Hexachlorobenzene	SVOA	331	U	331
Hexachlorobutadiene	SVOA	331	U	331
Hexachlorocyclopentadiene	SVOA	331	U	331
Hexachloroethane	SVOA	331	U	331
Indeno(1,2,3-cd)pyrene	SVOA	331	U	331
Isophorone	SVOA	331	U	331
N-Nitroso-di-n-dipropylamine	SVOA	331	U	331
N-Nitrosodiphenylamine	SVOA	331	U	331
Naphthalene	SVOA	331	U	331
Nitrobenzene	SVOA	331	U	331
Pentachlorophenol	SVOA	1650	U	1650
Phenanthrene	SVOA	331	U	331
Phenol	SVOA	331	U	331
Pyrene	SVOA	331	U	331

Attachment	1	Sheet No.	23 of 23
Originator	J. D. Skoglie	Date	10/2/12
Checked	N. K. Schiffern	Date	10/2/12
Calc. No.	0100D-CA-V0479	Rev. No.	0

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CALCULATION COVER SHEET

Project Title: 100-D Field Remediation **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0480

Subject: 100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation

Computer Program: Excel Program No: Excel 2003

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 = 4 Total = 5	J. D. Skoglie	N. K. Schiffern	C. H. Dobie	D. F. Obenauer	1/24/13

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:	10/03/12	Calc. No.:	0100D-CA-V0480	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/03/12
Subject:	100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	1 of 4

PURPOSE:

Provide documentation to support the calculation of the direct contact hazard quotient (HQ) and excess carcinogenic risk for the 100-D-66 waste site. 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, 2012, *Remaining Sites Verification Package for the 100-D-66, 116-DR-5 Outfall Spillway Waste Site*, Attachment to Waste Site Reclassification Form 2012-087, Washington Closure Hanford, Inc., 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, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	10/03/12	Calc. No.:	0100D-CA-V0480	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/03/12
Subject:	100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	2 of 4

METHODOLOGY:

The 100-D-66 waste site is comprised of two decision units for verification sampling consisting of the excavation and waste staging area footprints. The direct contact hazard quotient and carcinogenic risk calculations for the 100-D-66 waste site 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 100-D-66 waste site RSVP (WCH 2012). Of the contaminants of potential concern (COPCs) for this site boron, hexavalent chromium, molybdenum, and the detected polycyclic aromatic hydrocarbons (PAHs) require HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Nitrogen in nitrate requires an HQ and risk calculation because this analyte was detected above a Washington State or Hanford Site background value. 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 statistical value for boron is 1.16 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 1.6×10^{-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 3.7×10^{-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, then multiplied by 1.0×10^{-6}. For example, the statistical value for benzo(a)anthracene is 0.0284 mg/kg, divided by 1.37 mg/kg, and multiplied as indicated, is 2.1×10^{-8}. Comparing this value, and all other individual values, 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 can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual cancer risk values prior to rounding are used for this calculation. The sum of the excess cancer risk values is 4.0×10^{-7}. Comparing these values 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, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	10/03/12	Calc. No.:	0100D-CA-V0480	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/03/12
Subject:	100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	3 of 4

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 100-D-66 Waste Site.

Contaminants of Potential Concern	Statistical or Maximum Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.16	7,200	1.6E-04	--	--
Chromium, hexavalent[c]	0.43	240	1.8E-03	2.1	2.0E-07
Molybdenum	0.461	400	1.2E-03	--	--
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.0190	4,800	4.0E-06	--	--
Acenaphthylene [d]	1.32	4,800	2.8E-04	--	--
Anthracene	0.0108	24,000	4.5E-07	--	--
Benzo(a)anthracene	0.0284	--	--	1.37	2.1E-08
Benzo(a)pyrene	0.0174	--	--	0.137	1.3E-07
Benzo(b)fluoranthene	0.0154	--	--	1.37	1.1E-08
Benzo(ghi)perylene [d]	0.0127	2,400	5.3E-06	--	--
Benzo(k)fluoranthene	0.0289	--	--	1.37	2.1E-08
Chrysene	0.111	--	--	13.7	8.1E-09
Dibenz(a,h)anthracene	0.00674	--	--	1.37	4.9E-09
Fluoranthene	0.0387	3,200	1.2E-05	--	--
Fluorene	0.00978	3,200	3.1E-06	--	--
Indeno(1,2,3-cd)pyrene	0.00969	--	--	1.37	7.1E-09
Naphthalene	0.0293	1,600	1.8E-05	--	--
Phenanthrene [d]	0.0469	24,000	2.0E-06	--	--
Pyrene	0.0328	2,400	1.4E-05	--	--
Anions					
Nitrogen in nitrate [e]	31.2	128,000	2.4E-04	--	--
Totals					
Cumulative Hazard Quotient:			**3.7E-03**		
Cumulative Excess Cancer Risk:					**4.0E-07**

Notes:

[a] = From WCH (2012).

[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] = Value for the carcinogen RAG calculated based on the inhalation exposure pathway (WAC) 173-340-750(3), 1996.

[d] = Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
acenaphthylene surrogate: acenaphthene
benzo(g,h,i)perylene surrogate: pyrene
phenanthrene surrogate: anthracene

[e] = This is a statistical value that was obtained from converting "nitrate" to "nitrogen in nitrate".

-- = not applicable

RAG = remedial action goal

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	10/03/12	Calc. No.:	0100D-CA-V0480	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/03/12
Subject:	100-D-66 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	4 of 4

CONCLUSION:

The calculation in Table 1 demonstrates that the 100-D-66 waste site meets the requirements for the direct contact hazard quotients and excess carcinogenic risk 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 Field Remediation **Job No. 14655**

Area: 100-D

Discipline: Environmental *Calculation No: 0100D-CA-V0481

Subject: 100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater

Computer Program: Excel Program No: Excel 2003

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 = 4 Total = 5	C. H. Dobie *C H Dobie*	N. K. Schiffern *N K Schiffern*	J. D. Skoglie *[signature]*	D. F. Obenauer *D. F. Obenauer*	1/24/13

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:	C. H. Dobie	Date:	10/17/2012	Calc. No.:	0100D-CA-V0481	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/17/2012
Subject:	100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 1 of 4	

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-66 waste site. 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, 2012, *100-D-66 Waste Site Cleanup Verification 95% UCL Calculation*, 0100D-CA-V0479, 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:	C. H. Dobie CD	Date:	10/17/2012	Calc. No.:	0100D-CA-V0481	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern NS	Date:	10/17/2012
Subject:	100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 2 of 4	

METHODOLOGY:

The 100-D-66 waste site is comprised of two decision units for verification sampling consisting of the excavation and the waste staging area footprints. Hazard quotient and carcinogenic risk calculations for potential impact to groundwater at the 100-D-66 waste site were conservatively calculated for the entire waste site using the greater of the statistical or maximum value for each analyte in the 95% UCL calculation (WCH 2012). Of the contaminants of potential concern (COPCs) for this site, boron, hexavalent chromium, molybdenum, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene are included because no 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 the generic site RESRAD model (BHI 2005). Based on this model and a vadose zone of approximately 0.0 m (0.0 ft) thickness, a K_d value of 80 mL/g is adequate to show no migration to groundwater in 1,000 years using the generic RESRAD model (BHI 2005). Contaminants with a K_d of 80 mL/g are highly adsorbed to soil particles, and even when immersed in water, any migration will be negligible. Therefore, HQ and risk calculations were performed with the exclusion of these analytes with a K_d over 80 mL/g. Nitrogen in nitrate was quantitated at a concentration above Hanford Site background and has a K_d less than 80. All other site nonradionuclide COPCs were not detected, quantified below background levels, or have a K_d greater than or equal to 80. 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 1.16 mg/kg, divided by the noncarcinogenic RAG value of 320 mg/kg is 3.6×10^{-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-66 waste site is 1.8×10^{-1}. 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}. The 100-D-66 waste site does not have any constituents with carcinogen RAGs, the criterion for excess cancer risk is met. Consequently, the criterion for cumulative excess cancer risk for carcinogens 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 ground water 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.

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	C. H. Dobie	Date:	10/17/2012	Calc. No.:	0100D-CA-V0481	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern	Date:	10/17/2012
Subject:	100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 3 of 4	

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 x 10^{-6}: None
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-66 Waste Site.

Contaminants of Potential Concern	Statistical or Maximum Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.16	320	3.6E-03	--	--
Chromium, hexavalent [c]	0.43	4.8	9.0E-02	--	--
Molybdenum	0.461	8	5.8E-02	--	--
Polyaromatic Hydrocarbons					
Acenaphthene	0.0190	96	2.0E-04	--	--
Acenaphthylene [d]	1.32	96	1.4E-02	--	--
Anthracene	0.0108	240	4.5E-05	--	--
Fluoranthene	0.0387	64	6.0E-04	--	--
Fluorene	0.00978	64	1.5E-04	--	--
Naphthalene	0.0293	16	1.8E-03	--	--
Phenanthrene [d]	0.0469	240	2.0E-04	--	--
Pyrene	0.0328	48	6.8E-04	--	--
Anions					
Nitrogen in nitrate [e]	31.2	2560	1.2E-02	--	--
Totals					
Cumulative Hazard Quotient:			**1.8E-01**		
Cumulative Excess Cancer Risk:					**0.0E+00**

Notes:
[a] = From WCH (2012).
[b] = Value obtained from the Cleanup Levels and Risk Calculations (CLARC) database using Groundwater, Method B, results and the "100 times" model.
[c] = Value for the carcinogen RAG calculated based on the inhalation exposure pathway (WAC) 173-340-750(3), 1996.
[d] = Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
acenaphthylene surrogate: acenaphthene
phenanthrene surrogate: anthracene
[e] This is a statistical value that was obtained from converting "nitrate" to "nitrogen in nitrate".
-- = not applicable
RAG = remedial action goal

CONCLUSION:

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	C. H. Dobie *CD*	Date:	10/17/2012	Calc. No.:	0100D-CA-V0481	Rev.:	0
Project:	100-D Area Field Remediation	Job No:	14655	Checked:	N. K. Schiffern *NS*	Date:	10/17/2012
Subject:	100-D-66 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater					Sheet No. 4 of 4	

The calculation in Table 1 demonstrates that the 100-D-66 waste site 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 E

VERIFICATION SAMPLE RESULTS FOR THE SHORELINE SEGMENT OF THE 100-D-66 WASTE SITE

Figure E-1. Location of Sediment Samples for Shoreline Segment of the 100-D-66 Waste Site – Below the Ordinary High Water Mark.

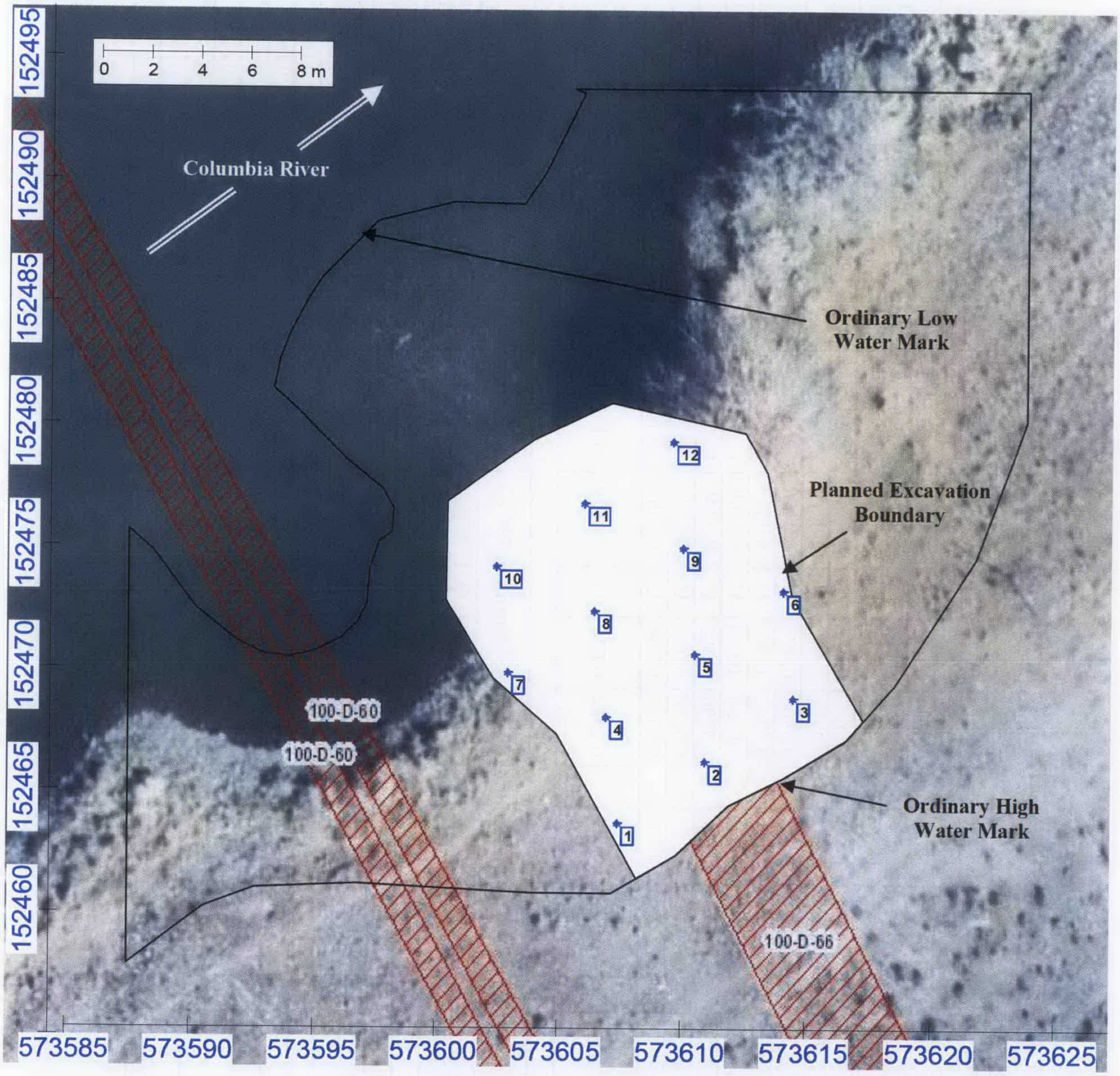

Table E-1. 100-D-66 Below the Ordinary High Water Mark Sample Results - Radionuclides. (2 Pages)

Sample Description	HEIS Number	Sample Date	Americium-241 GEA			Cesium-137			Cobalt-60			Europium-152			Europium-154			Europium-155		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Soil	J1M6V8	11/18/11	0.044	U	0.246	0.131		0.0281	0.005	U	0.0289	0.0041	U	0.07	-0.0177	U	0.09	0.005	U	0.0823
Soil	J1M6V9	11/18/11	-0.0312	U	0.13	0.174		0.0324	0.045	U	0.0381	0.217	U	0.106	-0.0213	U	0.089	0.007	U	0.0998
Soil	J1M6W0	11/18/11	0.0027	U	0.113	0.0559		0.0359	-0.003	U	0.0334	0.048	U	0.096	-0.0401	U	0.113	0.006	U	0.0887
Soil	J1M6W1	11/18/11	-0.0199	U	0.0732	0.303		0.0421	0.043	U	0.0506	0.479		0.107	0.0337	U	0.139	7E-04	U	0.109
Soil	J1M6W2	11/18/11	-0.0172	U	0.156	0.109		0.025	0.012	U	0.0286	0.101	U	0.074	-0.0111	U	0.078	0.043	U	0.07
Soil	J1M6W3	11/18/11	0.0099	U	0.258	0.1		0.0282	0.007	U	0.0319	0.0592	U	0.08	-0.0031	U	0.095	0.028	U	0.0897
Soil	J1M6W4	11/18/11	-0.0004	U	0.278	0.47		0.0306	0.065	U	0.0456	0.639		0.077	0.0064	U	0.093	0.062	U	0.102
Soil	J1M6W5	11/18/11	-0.0127	U	0.108	0.188		0.0342	-0.009	U	0.0347	0.172	U	0.106	0.043	U	0.117	0.027	U	0.0858
Soil	J1M6W6	11/18/11	-0.0393	U	0.0679	0.0245	U	0.0426	-0.004	U	0.0389	0.0324	U	0.105	-0.0233	U	0.117	0.014	U	0.0974
Soil	J1M6W7	11/18/11	0.0229	U	0.161	0.258		0.0236	0.012	U	0.0291	0.0934	U	0.072	-6E-05	U	0.079	0.026	U	0.0694
Soil	J1M6W8	11/18/11	-0.0893	U	0.264	0.293		0.0286	0.004	U	0.0325	0.261	U	0.093	0.0328	U	0.102	0.027	U	0.0903
Soil	J1M6W9	11/18/11	-0.0745	U	0.135	0.25		0.0311	0.044	U	0.0383	0.17	U	0.104	0.0101	U	0.095	-0.036	U	0.102
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	-0.0259	U	0.11	0.115		0.0364	0.024	U	0.0429	0.139	U	0.108	0.01	U	0.11	0.031	U	0.0903

Sample Description	HEIS Number	Sample Date	Plutonium-238			Plutonium-239/240			Uranium-234			Uranium-235			Uranium-238			Total Beta Radiostrontium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Soil	J1M6V8	11/18/11	-0.0065	U	0.155	0	U	0.121	1.18		0.128	0.0681	U	0.117	0.778		0.091	0.177	U	0.189
Soil	J1M6V9	11/18/11	0	U	0.888	-0.012	U	0.887	0.354		0.159	-0.0042	U	0.127	0.746		0.164	0.237		0.185
Soil	J1M6W0	11/18/11	-0.0028	U	0.118	0	U	0.106	0.235		0.0887	0	U	0.089	0.163		0.099	0.117	U	0.163
Soil	J1M6W1	11/18/11	0.0431	U	0.162	0.125	U	0.18	1.07		0.0915	0.0488	U	0.092	0.877		0.092	0.1	U	0.172
Soil	J1M6W2	11/18/11	0	U	0.143	-0.002	U	0.143	0.614		0.0921	0	U	0.092	0.783		0.103	0.057	U	0.166
Soil	J1M6W3	11/18/11	0	U	0.111	-0.001	U	0.11	0.406		0.0848	0	U	0.085	0.45		0.095	0.083	U	0.182
Soil	J1M6W4	11/18/11	0	U	0.115	0.029	U	0.115	0.841		0.129	0.0177	U	0.119	0.611		0.099	0.085	U	0.173
Soil	J1M6W5	11/18/11	0.0343	U	0.135	-0.002	U	0.135	1.08		0.133	0.0201	U	0.107	0.959		0.133	0.139	U	0.237
Soil	J1M6W6	11/18/11	0	U	0.127	0	U	0.127	0.658		0.0987	0.079	U	0.099	0.842		0.099	0.022	U	0.183
Soil	J1M6W7	11/18/11	0	U	0.128	0	U	0.128	0.684		0.0988	0	U	0.099	0.602		0.119	0.115	U	0.168
Soil	J1M6W8	11/18/11	0	U	0.122	0	U	0.122	1.34		0.102	0.0273	U	0.102	0.653		0.102	0.119	U	0.195
Soil	J1M6W9	11/18/11	-0.0018	U	0.135	0.0342	U	0.135	1		0.0818	0.0218	U	0.082	0.675		0.082	0.13	U	0.165
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	0	U	0.129	0.0293	U	0.156	0.463		0.109	0.0871	U	0.109	0.403		0.121	0.146	U	0.181

Table E-1. 100-D-66 Below the Ordinary High Water Mark Sample Results - Radionuclides. (2 Pages)

Sample Description	HEIS Number	Sample Date	Carbon-14			Nickel-63			Tritium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
Soil	J1M6V8	11/18/11	0.0627	U	0.477	6.04	U	13.4	0.101		0.0172
Soil	J1M6V9	11/18/11	-0.206	U	0.477	13.3	U	13.5	0.009	U	0.0208
Soil	J1M6W0	11/18/11	-0.272	U	0.474	2.55	U	12.9	0.013	U	0.0201
Soil	J1M6W1	11/18/11	0.0038	U	0.476	26.7		13.2	0.021	U	0.0398
Soil	J1M6W2	11/18/11	0.0729	U	0.477	4.47	U	13.2	0.016	U	0.0288
Soil	J1M6W3	11/18/11	0.0191	U	0.477	6.12	U	14.2	-0.002	U	0.0201
Soil	J1M6W4	11/18/11	17		0.477	6.01	U	13.8	0.014	U	0.0171
Soil	J1M6W5	11/18/11	0.0189	U	0.475	9.3	U	12.7	0.008	U	0.0259
Soil	J1M6W6	11/18/11	-0.132	U	0.474	6.91	U	13.1	0.018	U	0.0249
Soil	J1M6W7	11/18/11	0.0866	U	0.476	5.9	U	12.2	0.012	U	0.0377
Soil	J1M6W8	11/18/11	0.189	U	0.475	2.24	U	13.8	0.013	U	0.0329
Soil	J1M6W9	11/18/11	0.0715	U	0.474	7.46	U	12.8	-0.003	U	0.0334
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	0.195	U	0.477	12.5	U	12.8	4E-04	U	0.0214

Acronyms and notes apply to all of the tables in this appendix.
Note: Data qualified with C or J are considered acceptable values.
B= detected below reporting limit
HEIS = Hanford Environmental Information System
GEA = gamma energy analysis
J = estimated
MDA = minimum detectable activity
N = recovery exceeds upper or lower control limit
PQL = practical quantitation limit
Q = qualifier
U = undetected
X (metals) = interferences present

Table E-2. 100-D-66 Below the Ordinary High Water Mark Sample Results - Inorganics. (3 Pages)

Sample Description	Sample Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1M6V8	11/18/11	10100	X	1.4	1.3		0.34	4.2		0.59	107		0.069	0.37		0.03	0.88	U	0.88
Soil	J1M6V9	11/18/11	9960	X	1.5	1.3		0.38	1.8		0.66	139		0.076	0.38		0.033	0.98	U	0.98
Soil	J1M6W0	11/18/11	12700	X	1.5	1.2		0.36	2.1		0.62	101		0.071	0.56		0.031	0.92	U	0.92
Soil	J1M6W1	11/18/11	9400	X	1.7	1.1		0.41	3.2		0.7	90		0.081	0.36		0.035	1	U	1
Soil	J1M6W2	11/18/11	9420	X	1.6	1.2		0.4	3.5		0.69	128		0.08	0.37		0.035	1	U	1
Soil	J1M6W3	11/18/11	12300	X	1.4	1.1		0.35	2.7		0.61	104		0.07	0.51		0.03	0.9	U	0.9
Soil	J1M6W4	11/18/11	10900	X	1.5	1.1		0.37	3.9		0.65	106		0.074	0.49		0.032	0.96	U	0.96
Soil	J1M6W5	11/18/11	9600	X	1.5	0.94		0.38	6.4		0.66	104		0.076	0.37		0.033	0.98	U	0.98
Soil	J1M6W6	11/18/11	9080	X	1.5	1.1		0.37	3.6		0.65	124		0.074	0.33		0.032	0.96	U	0.96
Soil	J1M6W7	11/18/11	11200	X	1.6	0.98		0.38	3.2		0.66	89.3		0.076	0.46		0.033	0.98	U	0.98
Soil	J1M6W8	11/18/11	10800	X	1.5	1.1		0.37	4.7		0.64	119		0.074	0.51		0.032	0.95	U	0.95
Soil	J1M6W9	11/18/11	7640	X	1.5	1		0.36	3.2		0.63	80.3		0.073	0.32		0.032	0.94	U	0.94
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	9210	X	1.5	1.5		0.37	2		0.64	119		0.074	0.4		0.032	0.95	U	0.95
Equip Blank	J1M6X1	11/18/11	220	X	1.3	0.32	U	0.32	0.55	U	0.55	2.4		0.064	0.055	B	0.028	0.82	U	0.82

Sample Description	Sample Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1M6V8	11/18/11	0.11	B	0.037	5110	M	12.7	44.3	X	0.052	6.1	X	0.09	16.3	X	0.2	1.33		0.155
Soil	J1M6V9	11/18/11	0.09	B	0.041	7250		14.1	23.8	X	0.058	7.8	X	0.1	18.9	X	0.22	0.155	U	0.155
Soil	J1M6W0	11/18/11	0.11	B	0.039	6830		13.3	18.8	X	0.055	9.1	X	0.094	18.9	X	0.2	0.155	U	0.155
Soil	J1M6W1	11/18/11	0.39		0.044	4020		15	26.9	X	0.062	6.7	X	0.11	16.4	X	0.23	0.155	U	0.155
Soil	J1M6W2	11/18/11	0.19	B	0.043	5420		14.8	24.9	X	0.061	6.4	X	0.11	19.2	X	0.23	1.12		0.155
Soil	J1M6W3	11/18/11	0.26		0.038	5040		12.9	36.9	X	0.053	7.8	X	0.092	18	X	0.2	0.155	U	0.155
Soil	J1M6W4	11/18/11	0.34		0.04	4310		13.8	38.8	X	0.057	7.7	X	0.098	17.8	X	0.21	0.794		0.155
Soil	J1M6W5	11/18/11	0.31		0.041	3310		14.1	48.5	X	0.058	6	X	0.1	16.7	X	0.22	1.37		0.155
Soil	J1M6W6	11/18/11	0.13	B	0.04	3020		13.8	39.9	X	0.057	5.8	X	0.098	16.7	X	0.21	1.9		0.155
Soil	J1M6W7	11/18/11	0.28		0.041	3950		14.2	41.7	X	0.058	6.6	X	0.1	16.6	X	0.22	0.569		0.155
Soil	J1M6W8	11/18/11	0.43		0.04	4130		13.7	44.9	X	0.056	7.7	X	0.097	16.7	X	0.21	0.808		0.155
Soil	J1M6W9	11/18/11	0.74		0.039	3930		13.5	26.3	X	0.056	6.7	X	0.096	15.2	X	0.21	0.816		0.155
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	0.075	B	0.04	5720		13.7	24.2	X	0.057	8.6	X	0.097	20.2	X	0.21	0.236		0.155
Equip Blank	J1M6X1	11/18/11	0.034	U	0.034	49.4	C	11.8	0.25	X	0.049	0.1	BX	0.084	0.45	BX	0.18			

Table E-2. 100-D-66 Below the Ordinary High Water Mark Sample Results - Inorganics. (3 Pages)

Sample Description	Sample Number	Sample Date	Iron			Lead			Magnesium			Manganese			Mercury			Molybdenum		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1M6V8	11/18/11	19900	X	3.4	6.7		0.24	4790	X	3.3	224	X	0.09	0.015	B	0.006	0.23	U	0.23
Soil	J1M6V9	11/18/11	21700	X	3.8	4.3		0.27	4340	X	3.7	278	X	0.1	0.027		0.006	0.26	U	0.26
Soil	J1M6W0	11/18/11	25900	X	3.6	7		0.25	5850	X	3.5	304	X	0.094	0.013	B	0.006	0.24	U	0.24
Soil	J1M6W1	11/18/11	19300	X	4.1	10.4		0.29	4550	X	3.9	286	X	0.11	0.029		0.007	0.28	U	0.28
Soil	J1M6W2	11/18/11	19400	X	4	5.6		0.28	5250	X	3.9	323	X	0.11	0.025		0.006	0.27	U	0.27
Soil	J1M6W3	11/18/11	22800	X	3.5	11		0.25	5290	X	3.4	268	X	0.092	0.016	B	0.005	0.24	U	0.24
Soil	J1M6W4	11/18/11	22200	X	3.7	15		0.26	5250	X	3.6	340	X	0.098	0.057		0.007	0.25	U	0.25
Soil	J1M6W5	11/18/11	17400	X	3.8	10.3		0.27	4710	X	3.7	295	X	0.1	0.016	B	0.007	0.26	U	0.26
Soil	J1M6W6	11/18/11	16200	X	3.7	5.7		0.26	4010	X	3.6	251	X	0.098	0.01	B	0.006	0.25	U	0.25
Soil	J1M6W7	11/18/11	18700	X	3.8	8.9		0.27	4760	X	3.7	316	X	0.1	0.015	B	0.007	0.26	U	0.26
Soil	J1M6W8	11/18/11	21500	X	3.7	7.7		0.26	4560	X	3.6	388	X	0.097	0.019	B	0.007	0.25	U	0.25
Soil	J1M6W9	11/18/11	19400	X	3.6	14		0.26	4130	X	3.6	356	X	0.096	0.045		0.007	0.25	U	0.25
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	23500	X	3.7	4.2		0.26	4770	X	3.6	310	X	0.097	0.031		0.008	0.25	U	0.25
Equip Blank	J1M6X1	11/18/11	590	X	3.2	0.43		0.23	26.1	X	3.1	7.2	X	0.084	0.0052	U	0.005	0.22	U	0.22

Sample Description	Sample Number	Sample Date	Nickel			Potassium			Selenium			Silicon			Silver			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
Soil	J1M6V8	11/18/11	11.7	X	0.11	906		37	0.78	U	0.78	298	N	5.1	0.14	U	0.14	256		53.2
Soil	J1M6V9	11/18/11	12.6	X	0.12	812		40.9	0.86	U	0.86	354		5.6	0.16	U	0.16	290		58.8
Soil	J1M6W0	11/18/11	12.1	X	0.12	1380		38.5	0.81	U	0.81	301		5.3	0.15	U	0.15	227		55.5
Soil	J1M6W1	11/18/11	13.7	X	0.13	881		43.7	0.92	U	0.92	343		6	0.17	U	0.17	215		62.9
Soil	J1M6W2	11/18/11	12.1	X	0.13	862		43.2	0.91	U	0.91	289		6	0.17	U	0.17	215		62.1
Soil	J1M6W3	11/18/11	11.9	X	0.11	1280		37.6	0.79	U	0.79	354		5.2	0.15	U	0.15	271		54.1
Soil	J1M6W4	11/18/11	13	X	0.12	1020		40.2	0.84	U	0.84	344		5.5	0.16	U	0.16	214		57.8
Soil	J1M6W5	11/18/11	15.3	X	0.12	907		40.9	0.86	U	0.86	288		5.7	0.16	U	0.16	179		58.9
Soil	J1M6W6	11/18/11	12.3	X	0.12	670		40.1	0.84	U	0.84	280		5.5	0.16	U	0.16	192		57.7
Soil	J1M6W7	11/18/11	13.5	X	0.12	909		41.2	0.86	U	0.86	318		5.7	0.16	U	0.16	195		59.3
Soil	J1M6W8	11/18/11	13.5	X	0.12	939		39.9	0.84	U	0.84	267		5.5	0.16	U	0.16	208		57.3
Soil	J1M6W9	11/18/11	10.6	X	0.12	683		39.4	0.83	U	0.83	320		5.4	0.15	U	0.15	255		56.6
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	13.3	X	0.12	848		40	0.84	U	0.84	295		5.5	0.16	U	0.16	281		57.5
Equip Blank	J1M6X1	11/18/11	0.11	BX	0.1	58.4	B	34.5	0.72	U	0.72	181		4.8	0.13	U	0.13	49.6	U	49.6

Table E-2. 100-D-66 Below the Ordinary High Water Mark Sample Results - Inorganics. (3 Pages)

Sample Description	Sample Number	Sample Date	Vanadium			Zinc			Bromide			Chloride			Fluoride			Nitrogen in Nitrate		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1M6V8	11/18/11	42.5		0.085	55.3	X	0.36	0.39	U	0.39	2	U	2	0.83	U	0.83	2	B	0.32
Soil	J1M6V9	11/18/11	50.6		0.094	44.3	X	0.4	0.41	U	0.41	2.1	U	2.1	0.86	U	0.86	1	B	0.33
Soil	J1M6W0	11/18/11	54.4		0.088	62	X	0.37	0.39	U	0.39	2	U	2	0.83	UN	0.83	3		0.32
Soil	J1M6W1	11/18/11	41		0.1	93.4	X	0.42	0.41	U	0.41	2.1	U	2.1	0.88	U	0.88	8.2		0.33
Soil	J1M6W2	11/18/11	42.3		0.099	60.3	X	0.42	0.41	U	0.41	2.1	U	2.1	0.87	U	0.87	0.45	B	0.33
Soil	J1M6W3	11/18/11	48.8		0.086	84.6	X	0.36	0.4	U	0.4	2.1	U	2.1	0.86	U	0.86	0.87	B	0.33
Soil	J1M6W4	11/18/11	44.6		0.092	108	X	0.39	0.39	U	0.39	2	U	2	0.84	U	0.84	0.91	B	0.32
Soil	J1M6W5	11/18/11	35.2		0.094	83.2	X	0.4	0.41	U	0.41	2.1	U	2.1	0.87	U	0.87	1.8	B	0.33
Soil	J1M6W6	11/18/11	32.7		0.092	46.1	X	0.39	0.41	U	0.41	2.1	U	2.1	0.87	U	0.87	0.86	B	0.33
Soil	J1M6W7	11/18/11	39.8		0.094	74.9	X	0.4	0.42	U	0.42	2.1	U	2.1	0.89	U	0.89	1.4	B	0.34
Soil	J1M6W8	11/18/11	45.1		0.091	76.7	X	0.39	0.42	U	0.42	2.1	U	2.1	0.88	U	0.88	1.1	B	0.34
Soil	J1M6W9	11/18/11	42.4		0.09	141	X	0.38	0.42	U	0.42	2.1	U	2.1	0.88	U	0.88	2.7		0.34
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	55.5		0.092	47.9	X	0.39	0.4	U	0.4	2	U	2	0.85	U	0.85	1.7	B	0.33
Equip Blank	J1M6X1	11/18/11	0.62	B	0.079	1.9	X	0.33												

Sample Description	Sample Number	Sample Date	Nitrogen in Nitrite			Nitrogen in Nitrite and Nitrate			Phosphorous in Phosphate			Sulfate			pH		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Soil	J1M6V8	11/18/11	0.34	U	0.34	2.3		0.32	1.2	U	1.2	2	B	1.7	7.62		0.01
Soil	J1M6V9	11/18/11	0.35	U	0.35	0.67	B	0.34	1.3	U	1.3	21.4		1.8	9.4		0.01
Soil	J1M6W0	11/18/11	0.34	U	0.34	3.6		0.32	1.3	U	1.3	4.5	B	1.7	8.68		0.01
Soil	J1M6W1	11/18/11	0.36	U	0.36	4.8		0.32	1.3	U	1.3	9.3		1.8	7.45		0.01
Soil	J1M6W2	11/18/11	0.35	U	0.35	0.34	U	0.34	1.3	U	1.3	30		1.8	8.1		0.01
Soil	J1M6W3	11/18/11	0.35	U	0.35	0.57	B	0.34	1.3	U	1.3	1.8	U	1.8	7.81		0.01
Soil	J1M6W4	11/18/11	0.34	U	0.34	0.62	B	0.31	1.3	U	1.3	1.9	B	1.8	7.6		0.01
Soil	J1M6W5	11/18/11	0.35	U	0.35	2.1		0.35	1.3	U	1.3	3.1	B	1.8	7.95		0.01
Soil	J1M6W6	11/18/11	0.35	U	0.35	0.34	U	0.34	1.3	U	1.3	3.5	B	1.8	8.47		0.01
Soil	J1M6W7	11/18/11	0.36	U	0.36	0.92		0.35	1.3	U	1.3	2.9	B	1.9	7.17		0.01
Soil	J1M6W8	11/18/11	0.36	U	0.36	0.67	B	0.36	1.3	U	1.3	1.9	U	1.9	7.51		0.01
Soil	J1M6W9	11/18/11	0.36	U	0.36	2.3		0.32	1.3	U	1.3	5.4		1.9	8.1		0.01
Soil (Duplicate of J1M6V9)	J1M6X0	11/18/11	0.35	U	0.35	1.4		0.32	1.3	U	1.3	24.1		1.8	9.45		0.01

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6V8			J1M6V9			J1M6W0			J1M6W1		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	10	U	10	10	U	10	140	X	11
Acenaphthylene	9.2	U	9.2	9.3	U	9.3	9	U	9	9.5	U	9.5
Anthracene	3.1	U	3.1	3.2	U	3.2	3	U	3	3.2	U	3.2
Benzo(a)anthracene	3.3	U	3.3	68		3.3	3.2	U	3.2	3.4	U	3.4
Benzo(a)pyrene	6.6	U	6.6	48		6.6	6.4	U	6.4	13	JX	6.8
Benzo(b)fluoranthene	4.3	U	4.3	86		4.3	4.2	U	4.2	12	JX	4.5
Benzo(ghi)perylene	7.4	U	7.4	24	J	7.5	7.2	U	7.2	7.6	U	7.6
Benzo(k)fluoranthene	4	U	4	44		4.1	3.9	U	3.9	7.3	JX	4.2
Chrysene	5	U	5	70		5	4.8	U	4.8	6.1	J	5.1
Dibenz[a,h]anthracene	11	U	11	11	U	11	11	U	11	12	U	12
Fluoranthene	13	U	13	13	U	13	13	U	13	14	U	14
Fluorene	5.4	U	5.4	5.5	U	5.5	5.3	U	5.3	5.6	U	5.6
Indeno(1,2,3-cd)pyrene	12	U	12	37		12	12	U	12	13	U	13
Naphthalene	12	U	12	12	U	12	12	U	12	13	U	13
Phenanthrene	12	U	12	12	U	12	12	U	12	13	U	13
Pyrene	12	U	12	17	J	12	12	U	12	13	U	13
PCBs												
Aroclor-1016	2.8	U	2.8	2.8	U	2.8	2.9	U	2.9	3	U	3
Aroclor-1221	8.2	U	8.2	8	U	8	8.3	U	8.3	8.6	U	8.6
Aroclor-1232	2	U	2	2	U	2	2.1	U	2.1	2.2	U	2.2
Aroclor-1242	4.8	U	4.8	4.6	U	4.6	4.8	U	4.8	5	U	5
Aroclor-1248	4.8	U	4.8	4.6	U	4.6	4.8	U	4.8	5	U	5
Aroclor-1254	2.7	U	2.7	2.6	U	2.6	2.7	U	2.7	2.8	U	2.8
Aroclor-1260	2.7	U	2.7	2.6	U	2.6	2.7	U	2.7	2.8	U	2.8
Pesticides												
Aldrin	0.25	U	0.25	0.25	U	0.25	0.26	U	0.26	0.26	U	0.26
Alpha-BHC	0.21	U	0.21	0.21	U	0.21	0.23	U	0.23	0.22	U	0.22
alpha-Chlordane	0.32	U	0.32	0.32	U	0.32	0.34	U	0.34	0.33	U	0.33
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.66	U	0.66	0.66	U	0.66	0.7	U	0.7	0.69	U	0.69
Delta-BHC	0.4	U	0.4	0.4	U	0.4	0.42	U	0.42	0.42	U	0.42
Dichlorodiphenyldichloroethane	0.54	U	0.54	0.55	U	0.55	0.58	U	0.58	0.57	U	0.57
Dichlorodiphenyldichloroethylene	0.24	U	0.24	0.24	U	0.24	0.97	J	0.25	0.53	J	0.25
Dichlorodiphenyltrichloroethane	0.59	U	0.59	0.59	U	0.59	0.62	U	0.62	6.1	U	6.1
Dieldrin	0.21	U	0.21	0.21	U	0.21	0.22	U	0.22	0.22	U	0.22
Endosulfan I	0.17	U	0.17	0.18	U	0.18	0.19	U	0.19	0.18	U	0.18
Endosulfan II	0.29	U	0.29	0.29	U	0.29	0.3	U	0.3	0.3	U	0.3
Endosulfan sulfate	0.27	U	0.27	0.28	U	0.28	0.29	U	0.29	0.29	U	0.29
Endrin	0.3	U	0.3	0.31	U	0.31	0.32	U	0.32	0.32	U	0.32
Endrin aldehyde	0.17	U	0.17	0.17	U	0.17	0.18	U	0.18	0.18	U	0.18
Endrin ketone	0.49	U	0.49	0.49	U	0.49	0.52	U	0.52	0.51	U	0.51
Gamma-BHC (Lindane)	0.46	U	0.46	0.46	U	0.46	0.49	U	0.49	0.48	U	0.48
gamma-Chlordane	0.26	U	0.26	0.27	U	0.27	0.28	U	0.28	0.28	U	0.28
Heptachlor	0.21	U	0.21	0.21	U	0.21	0.23	U	0.23	0.22	U	0.22
Heptachlor epoxide	0.42	U	0.42	0.43	U	0.43	0.45	U	0.45	0.44	U	0.44
Methoxychlor	0.45	U	0.45	0.45	U	0.45	0.47	U	0.47	4.7	U	4.7
Toxaphene	16	U	16	16	U	16	17	U	17	16	U	16

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6V8			J1M6V9			J1M6W0			J1M6W1		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	29	U	29	29	U	29	29	U	29	29	U	29
1,2-Dichlorobenzene	23	U	23	23	U	23	22	U	22	23	U	23
1,3-Dichlorobenzene	12	U	12	13	U	13	12	U	12	12	U	12
1,4-Dichlorobenzene	14	U	14	14	U	14	14	U	14	14	U	14
2,4,5-Trichlorophenol	10	U	10	11	U	11	10	U	10	10	U	10
2,4,6-Trichlorophenol	10	U	10	11	U	11	10	U	10	10	U	10
2,4-Dichlorophenol	10	U	10	11	U	11	10	U	10	10	U	10
2,4-Dimethylphenol	68	U	68	69	U	69	67	U	67	68	U	68
2,4-Dinitrophenol	340	U	340	350	U	350	340	U	340	350	U	350
2,4-Dinitrotoluene	68	U	68	69	U	69	67	U	67	68	U	68
2,6-Dinitrotoluene	29	U	29	29	U	29	29	U	29	29	U	29
2-Chloronaphthalene	10	U	10	11	U	11	10	U	10	10	U	10
2-Chlorophenol	22	U	22	22	U	22	21	U	21	22	U	22
2-Methylnaphthalene	20	U	20	20	U	20	19	U	19	20	U	20
2-Methylphenol (cresol, o-)	13	U	13	14	U	14	13	U	13	13	U	13
2-Nitroaniline	51	U	51	53	U	53	51	U	51	52	U	52
2-Nitrophenol	10	U	10	11	U	11	10	U	10	10	U	10
3+4 Methylphenol (cresol, m+p)	34	U	34	35	U	35	34	U	34	34	U	34
3,3'-Dichlorobenzidine	93	U	93	95	U	95	92	U	92	93	U	93
3-Nitroaniline	75	U	75	77	U	77	74	U	74	76	U	76
4,6-Dinitro-2-methylphenol	340	U	340	350	U	350	340	U	340	340	U	340
4-Bromophenylphenyl ether	20	U	20	20	U	20	19	U	19	20	U	20
4-Chloro-3-methylphenol	68	U	68	69	U	69	67	U	67	68	U	68
4-Chloroaniline	84	U	84	86	U	86	83	U	83	85	U	85
4-Chlorophenylphenyl ether	22	U	22	22	U	22	21	U	21	22	U	22
4-Nitroaniline	75	U	75	76	U	76	74	U	74	75	U	75
4-Nitrophenol	100	U	100	100	U	100	99	U	99	100	U	100
Acenaphthene	11	U	11	11	U	11	10	U	10	11	U	11
Acenaphthylene	18	U	18	18	U	18	17	U	17	18	U	18
Anthracene	18	U	18	18	U	18	17	U	17	18	U	18
Benzo(a)anthracene	21	U	21	21	U	21	20	U	20	24	J	21
Benzo(a)pyrene	21	U	21	21	U	21	20	U	20	21	U	21
Benzo(b)fluoranthene	27	U	27	28	U	28	27	U	27	34	JK	27
Benzo(ghi)perylene	16	U	16	17	U	17	16	U	16	17	U	17
Benzo(k)fluoranthene	41	U	41	42	U	42	41	U	41	41	U	41
Bis(2-chloro-1-methylethyl)ether	24	U	24	24	U	24	23	U	23	24	U	24
Bis(2-Chloroethoxy)methane	24	U	24	24	U	24	23	U	23	24	U	24
Bis(2-chloroethyl) ether	17	U	17	17	U	17	17	U	17	17	U	17
Bis(2-ethylhexyl) phthalate	47	U	47	48	U	48	47	U	47	48	U	48
Butylbenzylphthalate	44	U	44	45	U	45	44	U	44	45	U	45
Carbazole	37	U	37	38	U	38	37	U	37	37	U	37
Chrysene	28	U	28	28	U	28	27	U	27	28	U	28
Di-n-butylphthalate	30	U	30	31	U	31	30	U	30	30	U	30
Di-n-octylphthalate	15	U	15	15	U	15	15	U	15	15	U	15
Dibenz[a,h]anthracene	20	U	20	20	U	20	19	U	19	20	U	20

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6V8			J1M6V9			J1M6W0			J1M6W1		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Dibenzofuran	21	U	21	21	U	21	20	U	20	21	U	21
Diethyl phthalate	27	U	27	27	U	27	26	U	26	27	U	27
Dimethyl phthalate	41	JB	24	31	JB	24	130	JB	23	55	JB	24
Fluoranthene	37	U	37	38	U	38	37	U	37	37	U	37
Fluorene	19	U	19	19	U	19	18	U	18	19	U	19
Hexachlorobenzene	30	U	30	31	U	31	30	U	30	30	U	30
Hexachlorobutadiene	10	U	10	11	U	11	10	U	10	10	U	10
Hexachlorocyclopentadiene	51	U	51	53	U	53	51	U	51	52	U	52
Hexachloroethane	22	U	22	22	U	22	22	U	22	22	U	22
Indeno(1,2,3-cd)pyrene	23	U	23	23	U	23	22	U	22	23	U	23
Isophorone	18	U	18	18	U	18	17	U	17	18	U	18
N-Nitroso-di-n-dipropylamine	32	U	32	33	U	33	32	U	32	32	U	32
N-Nitrosodiphenylamine	22	U	22	22	U	22	21	U	21	22	U	22
Naphthalene	32	U	32	33	U	33	32	U	32	32	U	32
Nitrobenzene	23	U	23	23	U	23	22	U	22	23	U	23
Pentachlorophenol	340	U	340	350	U	350	340	U	340	340	U	340
Phenanthrene	18	U	18	18	U	18	17	U	17	18	U	18
Phenol	19	U	19	19	U	19	18	U	18	19	U	19
Pyrene	12	U	12	13	U	13	12	U	12	25	J	13

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W2			J1M6W3			J1M6W4			J1M6W5		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	10	U	10	11	U	11	14	JX	10	120	X	11
Acenaphthylene	9.4	U	9.4	9.7	U	9.7	9.2	U	9.2	9.7	U	9.7
Anthracene	3.2	U	3.2	3.3	U	3.3	3.1	U	3.1	3.3	U	3.3
Benzo(a)anthracene	3.3	U	3.3	3.4	U	3.4	3.3	U	3.3	36		3.4
Benzo(a)pyrene	6.7	U	6.7	6.9	U	6.9	6.6	U	6.6	24	X	6.9
Benzo(b)fluoranthene	4.4	U	4.4	4.5	U	4.5	4.3	U	4.3	28		4.5
Benzo(ghi)perylene	7.6	U	7.6	7.7	U	7.7	7.4	U	7.4	7.7	U	7.7
Benzo(k)fluoranthene	4.1	U	4.1	4.2	U	4.2	4	U	4	16		4.2
Chrysene	5.1	U	5.1	5.2	U	5.2	5	U	5	23	J	5.2
Dibenz[a,h]anthracene	12	U	12	12	U	12	11	U	11	12	U	12
Fluoranthene	14	U	14	14	U	14	13	U	13	30	J	14
Fluorene	5.5	U	5.5	5.7	U	5.7	5.4	U	5.4	5.7	U	5.7
Indeno(1,2,3-cd)pyrene	13	U	13	13	U	13	12	U	12	14	J	13
Naphthalene	13	U	13	13	U	13	12	U	12	13	U	13
Phenanthrene	13	U	13	13	U	13	12	U	12	13	U	13
Pyrene	13	U	13	13	U	13	12	U	12	34	JX	13
PCBs												
Aroclor-1016	3	U	3	3	U	3	2.7	U	2.7	2.9	U	2.9
Aroclor-1221	8.7	U	8.7	8.6	U	8.6	7.9	U	7.9	8.4	U	8.4
Aroclor-1232	2.2	U	2.2	2.1	U	2.1	2	U	2	2.1	U	2.1
Aroclor-1242	5	U	5	5	U	5	4.6	U	4.6	4.9	U	4.9
Aroclor-1248	5	U	5	5	U	5	4.6	U	4.6	4.9	U	4.9
Aroclor-1254	2.8	U	2.8	2.8	U	2.8	2.6	U	2.6	2.7	U	2.7
Aroclor-1260	2.8	U	2.8	2.8	U	2.8	2.6	U	2.6	2.7	U	2.7
Pesticides												
Aldrin	0.25	U	0.25	0.26	U	0.26	0.26	U	0.26	0.27	U	0.27
Alpha-BHC	0.21	U	0.21	0.23	U	0.23	0.22	U	0.22	0.23	U	0.23
alpha-Chlordane	0.32	U	0.32	0.34	U	0.34	0.33	U	0.33	0.34	U	0.34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.67	U	0.67	0.7	U	0.7	0.68	U	0.68	0.71	U	0.71
Delta-BHC	0.4	U	0.4	0.42	U	0.42	0.41	U	0.41	0.43	U	0.43
Dichlorodiphenyldichloroethane	0.55	U	0.55	0.57	U	0.57	0.56	U	0.56	0.58	U	0.58
Dichlorodiphenyldichloroethylene	0.24	U	0.24	0.53	J	0.25	0.24	U	0.24	0.25	U	0.25
Dichlorodiphenyltrichloroethane	0.59	U	0.59	0.62	U	0.62	0.61	U	0.61	6.3	U	6.3
Dieldrin	0.21	U	0.21	0.22	U	0.22	0.22	U	0.22	0.22	U	0.22
Endosulfan I	0.18	U	0.18	0.19	U	0.19	0.18	U	0.18	0.19	U	0.19
Endosulfan II	0.29	U	0.29	0.3	U	0.3	0.29	U	0.29	0.3	U	0.3
Endosulfan sulfate	0.28	U	0.28	0.29	U	0.29	0.28	U	0.28	0.29	U	0.29
Endrin	0.31	U	0.31	0.32	U	0.32	0.31	U	0.31	0.33	U	0.33
Endrin aldehyde	0.17	U	0.17	0.18	U	0.18	0.18	U	0.18	0.18	U	0.18
Endrin ketone	0.49	U	0.49	0.51	U	0.51	0.5	U	0.5	0.52	U	0.52
Gamma-BHC (Lindane)	0.47	U	0.47	0.49	U	0.49	0.48	U	0.48	0.49	U	0.49
gamma-Chlordane	0.27	U	0.27	0.28	U	0.28	0.27	U	0.27	0.28	U	0.28
Heptachlor	0.21	U	0.21	0.23	U	0.23	0.22	U	0.22	0.23	U	0.23
Heptachlor epoxide	0.43	U	0.43	0.45	U	0.45	0.44	U	0.44	0.45	U	0.45
Methoxychlor	0.45	U	0.45	0.47	U	0.47	0.46	U	0.46	4.8	U	4.8
Toxaphene	16	U	16	17	U	17	16	U	16	17	U	17

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W2			J1M6W3			J1M6W4			J1M6W5		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	30	U	30	30	U	30	27	U	27	30	U	30
1,2-Dichlorobenzene	23	U	23	23	U	23	21	U	21	24	U	24
1,3-Dichlorobenzene	13	U	13	13	U	13	12	U	12	13	U	13
1,4-Dichlorobenzene	14	U	14	14	U	14	13	U	13	15	U	15
2,4,5-Trichlorophenol	11	U	11	11	U	11	9.8	U	9.8	11	U	11
2,4,6-Trichlorophenol	11	U	11	11	U	11	9.8	U	9.8	11	U	11
2,4-Dichlorophenol	11	U	11	11	U	11	9.8	U	9.8	11	U	11
2,4-Dimethylphenol	70	U	70	70	U	70	64	U	64	71	U	71
2,4-Dinitrophenol	350	U	350	350	U	350	330	U	330	360	U	360
2,4-Dinitrotoluene	70	U	70	70	U	70	64	U	64	71	U	71
2,6-Dinitrotoluene	30	U	30	30	U	30	27	U	27	30	U	30
2-Chloronaphthalene	11	U	11	11	U	11	9.8	U	9.8	11	U	11
2-Chlorophenol	22	U	22	22	U	22	21	U	21	22	U	22
2-Methylnaphthalene	20	U	20	20	U	20	19	U	19	20	U	20
2-Methylphenol (cresol, o-)	14	U	14	14	U	14	13	U	13	14	U	14
2-Nitroaniline	53	U	53	53	U	53	49	U	49	53	U	53
2-Nitrophenol	11	U	11	11	U	11	9.8	U	9.8	11	U	11
3+4 Methylphenol (cresol, m+p)	35	U	35	35	U	35	32	U	32	35	U	35
3,3'-Dichlorobenzidine	95	U	95	95	U	95	88	U	88	96	U	96
3-Nitroaniline	77	U	77	77	U	77	71	U	71	78	U	78
4,6-Dinitro-2-methylphenol	350	U	350	350	U	350	320	U	320	350	U	350
4-Bromophenylphenyl ether	20	U	20	20	U	20	19	U	19	20	U	20
4-Chloro-3-methylphenol	70	U	70	70	U	70	64	U	64	71	U	71
4-Chloroaniline	87	U	87	86	U	86	80	U	80	88	U	88
4-Chlorophenylphenyl ether	22	U	22	22	U	22	21	U	21	22	U	22
4-Nitroaniline	77	U	77	76	U	76	71	U	71	78	U	78
4-Nitrophenol	100	U	100	100	U	100	95	U	95	100	U	100
Acenaphthene	11	U	11	11	U	11	10	U	10	11	U	11
Acenaphthylene	18	U	18	18	U	18	17	U	17	18	U	18
Anthracene	18	U	18	18	U	18	17	U	17	18	U	18
Benzo(a)anthracene	21	U	21	21	U	21	20	U	20	41	J	21
Benzo(a)pyrene	21	U	21	21	U	21	20	U	20	32	J	21
Benzo(b)fluoranthene	28	U	28	28	U	28	26	U	26	62	JK	28
Benzo(ghi)perylene	17	U	17	17	U	17	16	U	16	17	U	17
Benzo(k)fluoranthene	42	U	42	42	U	42	39	U	39	43	U	43
Bis(2-chloro-1-methylethyl)ether	24	U	24	24	U	24	22	U	22	25	U	25
Bis(2-Chloroethoxy)methane	24	U	24	24	U	24	22	U	22	25	U	25
Bis(2-chloroethyl) ether	18	U	18	18	U	18	16	U	16	18	U	18
Bis(2-ethylhexyl) phthalate	49	U	49	49	U	49	45	U	45	49	U	49
Butylbenzylphthalate	46	U	46	45	U	45	42	U	42	46	U	46
Carbazole	38	U	38	38	U	38	35	U	35	38	U	38
Chrysene	29	U	29	28	U	28	26	U	26	36	J	29
Di-n-butylphthalate	31	U	31	31	U	31	28	U	28	31	U	31
Di-n-octylphthalate	15	U	15	15	U	15	14	U	14	15	U	15
Dibenz[a,h]anthracene	20	U	20	20	U	20	19	U	19	20	U	20

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W2			J1M6W3			J1M6W4			J1M6W5		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Dibenzofuran	21	U	21	21	U	21	20	U	20	21	U	21
Diethyl phthalate	28	U	28	27	U	27	25	U	25	28	U	28
Dimethyl phthalate	180	JB	24	73	JB	24	37	JB	22	110	JB	25
Fluoranthene	38	U	38	38	U	38	35	U	35	39	J	38
Fluorene	19	U	19	19	U	19	18	U	18	19	U	19
Hexachlorobenzene	31	U	31	31	U	31	28	U	28	31	U	31
Hexachlorobutadiene	11	U	11	11	U	11	9.8	U	9.8	11	U	11
Hexachlorocyclopentadiene	53	U	53	53	U	53	49	U	49	53	U	53
Hexachloroethane	23	U	23	22	U	22	21	U	21	23	U	23
Indeno(1,2,3-cd)pyrene	23	U	23	23	U	23	21	U	21	24	U	24
Isophorone	18	U	18	18	U	18	17	U	17	18	U	18
N-Nitroso-di-n-dipropylamine	33	U	33	33	U	33	30	U	30	33	U	33
N-Nitrosodiphenylamine	22	U	22	22	U	22	21	U	21	22	U	22
Naphthalene	33	U	33	33	U	33	30	U	30	33	U	33
Nitrobenzene	23	U	23	23	U	23	21	U	21	24	U	24
Pentachlorophenol	350	U	350	350	U	350	320	U	320	350	U	350
Phenanthrene	18	U	18	18	U	18	17	U	17	18	U	18
Phenol	19	U	19	19	U	19	18	U	18	19	U	19
Pyrene	13	U	13	13	U	13	12	U	12	52	J	13

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W6			J1M6W7			J1M6W8			J1M6W9		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
PAHs												
Acenaphthene	110	X	11	42	JX	11	11	U	11	270	X	11
Acenaphthylene	9.6	U	9.6	9.7	U	9.7	10	U	10	9.9	U	9.9
Anthracene	3.2	U	3.2	3.3	U	3.3	3.4	U	3.4	3.4	U	3.4
Benzo(a)anthracene	3.4	U	3.4	8	JX	3.4	180		3.6	990	X	3.5
Benzo(a)pyrene	6.8	U	6.8	13	J	6.9	180		7.2	1100		7.1
Benzo(b)fluoranthene	4.5	U	4.5	12	J	4.5	200		4.7	1100		4.6
Benzo(ghi)perylene	7.7	U	7.7	7.7	U	7.7	54		8.1	440		7.9
Benzo(k)fluoranthene	4.2	U	4.2	6.5	J	4.2	130		4.4	650		4.3
Chrysene	5.1	U	5.1	8.7	J	5.2	170		5.4	1000		5.3
Dibenz[a,h]anthracene	12	U	12	12	U	12	23	J	12	110	X	12
Fluoranthene	14	U	14	14	U	14	91		15	560		14
Fluorene	5.6	U	5.6	5.7	U	5.7	5.9	U	5.9	5.8	U	5.8
Indeno(1,2,3-cd)pyrene	13	U	13	13	U	13	90		13	570		13
Naphthalene	13	U	13	13	U	13	13	U	13	13	U	13
Phenanthrene	13	U	13	13	U	13	13	U	13	26	JX	13
Pyrene	13	U	13	13	U	13	140		13	880		13
PCBs												
Aroclor-1016	2.8	U	2.8	3	U	3	2.9	U	2.9	2.9	U	2.9
Aroclor-1221	8.1	U	8.1	8.7	U	8.7	8.5	U	8.5	8.5	U	8.5
Aroclor-1232	2	U	2	2.2	U	2.2	2.1	U	2.1	2.1	U	2.1
Aroclor-1242	4.7	U	4.7	5.1	U	5.1	5	U	5	4.9	U	4.9
Aroclor-1248	4.7	U	4.7	5.1	U	5.1	5	U	5	4.9	U	4.9
Aroclor-1254	2.6	U	2.6	2.8	U	2.8	2.8	U	2.8	2.8	U	2.8
Aroclor-1260	2.6	U	2.6	2.8	U	2.8	2.8	U	2.8	2.8	U	2.8
Pesticides												
Aldrin	0.26	U	0.26	0.28	U	0.28	0.28	U	0.28	0.26	U	0.26
Alpha-BHC	0.22	U	0.22	0.24	U	0.24	0.24	U	0.24	0.22	U	0.22
alpha-Chlordane	0.34	U	0.34	0.36	U	0.36	0.35	U	0.35	0.33	U	0.33
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.69	U	0.69	0.75	U	0.75	0.73	U	0.73	0.68	U	0.68
Delta-BHC	0.42	U	0.42	0.45	U	0.45	0.44	U	0.44	0.41	U	0.41
Dichlorodiphenyldichloroethane	0.57	U	0.57	0.62	U	0.62	0.6	U	0.6	0.56	U	0.56
Dichlorodiphenyldichloroethylene	0.25	U	0.25	0.27	U	0.27	0.26	U	0.26	0.24	U	0.24
Dichlorodiphenyltrichloroethane	0.62	U	0.62	6.7	U	6.7	6.5	U	6.5	6	U	6
Dieldrin	0.22	U	0.22	0.24	U	0.24	0.23	U	0.23	0.22	U	0.22
Endosulfan I	0.18	U	0.18	0.2	U	0.2	0.19	U	0.19	0.18	U	0.18
Endosulfan II	0.3	U	0.3	0.32	U	0.32	0.32	U	0.32	0.29	U	0.29
Endosulfan sulfate	0.29	U	0.29	0.31	U	0.31	0.3	U	0.3	0.28	U	0.28
Endrin	0.32	U	0.32	0.35	U	0.35	0.34	U	0.34	0.31	U	0.31
Endrin aldehyde	0.18	U	0.18	0.19	U	0.19	0.19	U	0.19	0.18	U	0.18
Endrin ketone	0.51	U	0.51	0.55	U	0.55	0.54	U	0.54	0.5	U	0.5
Gamma-BHC (Lindane)	0.48	U	0.48	0.52	U	0.52	0.51	U	0.51	0.48	U	0.48
gamma-Chlordane	0.28	U	0.28	0.3	U	0.3	0.29	U	0.29	0.27	U	0.27
Heptachlor	0.22	U	0.22	0.24	U	0.24	0.24	U	0.24	0.22	U	0.22
Heptachlor epoxide	0.44	U	0.44	0.48	U	0.48	0.47	U	0.47	0.44	U	0.44
Methoxychlor	0.47	U	0.47	5.1	U	5.1	4.9	U	4.9	4.6	U	4.6
Toxaphene	16	U	16	18	U	18	17	U	17	16	U	16

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W6			J1M6W7			J1M6W8			J1M6W9		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOAs												
1,2,4-Trichlorobenzene	28	U	28	30	U	30	30	U	30	31	U	31
1,2-Dichlorobenzene	22	U	22	23	U	23	24	U	24	25	U	25
1,3-Dichlorobenzene	12	U	12	13	U	13	13	U	13	13	U	13
1,4-Dichlorobenzene	14	U	14	14	U	14	15	U	15	15	U	15
2,4,5-Trichlorophenol	10	U	10	11	U	11	11	U	11	11	U	11
2,4,6-Trichlorophenol	10	U	10	11	U	11	11	U	11	11	U	11
2,4-Dichlorophenol	10	U	10	11	U	11	11	U	11	11	U	11
2,4-Dimethylphenol	66	U	66	70	U	70	71	U	71	74	U	74
2,4-Dinitrophenol	330	U	330	350	U	350	360	U	360	370	U	370
2,4-Dinitrotoluene	66	U	66	70	U	70	71	U	71	74	U	74
2,6-Dinitrotoluene	28	U	28	30	U	30	30	U	30	31	U	31
2-Chloronaphthalene	10	U	10	11	U	11	11	U	11	11	U	11
2-Chlorophenol	21	U	21	22	U	22	23	U	23	24	U	24
2-Methylnaphthalene	19	U	19	20	U	20	20	U	20	21	U	21
2-Methylphenol (cresol, o-)	13	U	13	14	U	14	14	U	14	15	U	15
2-Nitroaniline	50	U	50	53	U	53	54	U	54	56	U	56
2-Nitrophenol	10	U	10	11	U	11	11	U	11	11	U	11
3+4 Methylphenol (cresol, m+p)	33	U	33	35	U	35	35	U	35	37	U	37
3,3'-Dichlorobenzidine	90	U	90	95	U	95	97	U	97	100	U	100
3-Nitroaniline	73	U	73	77	U	77	78	U	78	82	U	82
4,6-Dinitro-2-methylphenol	330	U	330	350	U	350	350	U	350	370	U	370
4-Bromophenylphenyl ether	19	U	19	20	U	20	20	U	20	21	U	21
4-Chloro-3-methylphenol	66	U	66	70	U	70	71	U	71	74	U	74
4-Chloroaniline	82	U	82	86	U	86	88	U	88	92	U	92
4-Chlorophenylphenyl ether	21	U	21	22	U	22	23	U	23	24	U	24
4-Nitroaniline	72	U	72	76	U	76	78	U	78	81	U	81
4-Nitrophenol	97	U	97	100	U	100	100	U	100	110	U	110
Acenaphthene	10	U	10	11	U	11	11	U	11	12	U	12
Acenaphthylene	17	U	17	18	U	18	18	U	18	19	U	19
Anthracene	17	U	17	18	U	18	18	U	18	19	U	19
Benzo(a)anthracene	20	U	20	21	U	21	81	J	21	22	U	22
Benzo(a)pyrene	20	U	20	21	U	21	71	J	21	22	U	22
Benzo(b)fluoranthene	26	U	26	28	U	28	150	JK	28	29	U	29
Benzo(ghi)perylene	16	U	16	17	U	17	37	J	17	18	U	18
Benzo(k)fluoranthene	40	U	40	42	U	42	43	U	43	45	U	45
Bis(2-chloro-1-methylethyl)ether	23	U	23	24	U	24	25	U	25	26	U	26
Bis(2-Chloroethoxy)methane	23	U	23	24	U	24	25	U	25	26	U	26
Bis(2-chloroethyl) ether	17	U	17	18	U	18	18	U	18	19	U	19
Bis(2-ethylhexyl) phthalate	46	U	46	49	U	49	49	U	49	52	U	52
Butylbenzylphthalate	43	U	43	45	U	45	46	U	46	48	U	48
Carbazole	36	U	36	38	U	38	39	U	39	40	U	40
Chrysene	27	U	27	28	U	28	81	J	29	30	U	30
Di-n-butylphthalate	29	U	29	31	U	31	31	U	31	33	U	33
Di-n-octylphthalate	14	U	14	15	U	15	15	U	15	16	U	16
Dibenz[a,h]anthracene	19	U	19	20	U	20	20	U	20	21	U	21

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6W6			J1M6W7			J1M6W8			J1M6W9		
	11/18/2011			11/18/2011			11/18/2011			11/18/2011		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Dibenzofuran	20	U	20	21	U	21	21	U	21	22	U	22
Diethyl phthalate	26	U	26	27	U	27	28	U	28	29	U	29
Dimethyl phthalate	54	JB	23	160	JB	24	85	JB	25	50	JB	26
Fluoranthene	36	U	36	38	U	38	46	J	39	40	U	40
Fluorene	18	U	18	19	U	19	19	U	19	20	U	20
Hexachlorobenzene	29	U	29	31	U	31	31	U	31	33	U	33
Hexachlorobutadiene	10	U	10	11	U	11	11	U	11	11	U	11
Hexachlorocyclopentadiene	50	U	50	53	U	53	54	U	54	56	U	56
Hexachloroethane	21	U	21	22	U	22	23	U	23	24	U	24
Indeno(1,2,3-cd)pyrene	22	U	22	23	U	23	30	J	24	25	U	25
Isophorone	17	U	17	18	U	18	18	U	18	19	U	19
N-Nitroso-di-n-dipropylamine	31	U	31	33	U	33	33	U	33	35	U	35
N-Nitrosodiphenylamine	21	U	21	22	U	22	23	U	23	24	U	24
Naphthalene	31	U	31	33	U	33	33	U	33	35	U	35
Nitrobenzene	22	U	22	23	U	23	24	U	24	25	U	25
Pentachlorophenol	330	U	330	350	U	350	350	U	350	370	U	370
Phenanthrene	17	U	17	18	U	18	18	U	18	19	U	19
Phenol	18	U	18	19	U	19	19	U	19	20	U	20
Pyrene	12	U	12	13	U	13	74	J	13	14	U	14

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6X0 (Duplicate of J1M6V9)		
	11/18/2011		
	µg/kg	Q	PQL
PAHs			
Acenaphthene	11	U	11
Acenaphthylene	9.6	U	9.6
Anthracene	3.3	U	3.3
Benzo(a)anthracene	3.4	U	3.4
Benzo(a)pyrene	6.8	U	6.8
Benzo(b)fluoranthene	4.5	U	4.5
Benzo(ghi)perylene	7.7	U	7.7
Benzo(k)fluoranthene	4.2	U	4.2
Chrysene	5.2	U	5.2
Dibenz[a,h]anthracene	12	U	12
Fluoranthene	14	U	14
Fluorene	5.6	U	5.6
Indeno(1,2,3-cd)pyrene	13	U	13
Naphthalene	13	U	13
Phenanthrene	13	U	13
Pyrene	13	U	13
PCBs			
Aroclor-1016	2.9	U	2.9
Aroclor-1221	8.4	U	8.4
Aroclor-1232	2.1	U	2.1
Aroclor-1242	4.9	U	4.9
Aroclor-1248	4.9	U	4.9
Aroclor-1254	2.7	U	2.7
Aroclor-1260	2.7	U	2.7
Pesticides			
Aldrin	0.25	U	0.25
Alpha-BHC	0.21	U	0.21
alpha-Chlordane	0.32	U	0.32
beta-1,2,3,4,5,6-Hexachlorocyclohexane	0.66	U	0.66
Delta-BHC	0.4	U	0.4
Dichlorodiphenyldichloroethane	0.55	U	0.55
Dichlorodiphenyldichloroethylene	0.24	U	0.24
Dichlorodiphenyltrichloroethane	0.59	U	0.59
Dieldrin	0.21	U	0.21
Endosulfan I	0.18	U	0.18
Endosulfan II	0.29	U	0.29
Endosulfan sulfate	0.28	U	0.28
Endrin	0.31	U	0.31
Endrin aldehyde	0.17	U	0.17
Endrin ketone	0.49	U	0.49
Gamma-BHC (Lindane)	0.46	U	0.46
gamma-Chlordane	0.27	U	0.27
Heptachlor	0.21	U	0.21
Heptachlor epoxide	0.43	U	0.43
Methoxychlor	0.45	U	0.45
Toxaphene	16	U	16

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6X0 (Duplicate of J1M6V9) 11/18/2011		
	µg/kg	Q	PQL
SVOAs			
1,2,4-Trichlorobenzene	30	U	30
1,2-Dichlorobenzene	23	U	23
1,3-Dichlorobenzene	13	U	13
1,4-Dichlorobenzene	15	U	15
2,4,5-Trichlorophenol	11	U	11
2,4,6-Trichlorophenol	11	U	11
2,4-Dichlorophenol	11	U	11
2,4-Dimethylphenol	70	U	70
2,4-Dinitrophenol	360	U	360
2,4-Dinitrotoluene	70	U	70
2,6-Dinitrotoluene	30	U	30
2-Chloronaphthalene	11	U	11
2-Chlorophenol	22	U	22
2-Methylnaphthalene	20	U	20
2-Methylphenol (cresol, o-)	14	U	14
2-Nitroaniline	53	U	53
2-Nitrophenol	11	U	11
3+4 Methylphenol (cresol, m+p)	35	U	35
3,3'-Dichlorobenzidine	96	U	96
3-Nitroaniline	78	U	78
4,6-Dinitro-2-methylphenol	350	U	350
4-Bromophenylphenyl ether	20	U	20
4-Chloro-3-methylphenol	70	U	70
4-Chloroaniline	87	U	87
4-Chlorophenylphenyl ether	22	U	22
4-Nitroaniline	77	U	77
4-Nitrophenol	100	U	100
Acenaphthene	11	U	11
Acenaphthylene	18	U	18
Anthracene	18	U	18
Benzo(a)anthracene	21	U	21
Benzo(a)pyrene	21	U	21
Benzo(b)fluoranthene	28	U	28
Benzo(ghi)perylene	17	U	17
Benzo(k)fluoranthene	43	U	43
Bis(2-chloro-1-methylethyl)ether	25	U	25
Bis(2-Chloroethoxy)methane	25	U	25
Bis(2-chloroethyl) ether	18	U	18
Bis(2-ethylhexyl) phthalate	49	U	49
Butylbenzylphthalate	46	U	46
Carbazole	38	U	38
Chrysene	29	U	29
Di-n-butylphthalate	31	U	31
Di-n-octylphthalate	15	U	15

Table E-3. 100-D-66 Below the Ordinary High Water Mark Sample Results - Organics. (12 Pages)

Constituent	J1M6X0 (Duplicate of J1M6V9)		
	11/18/2011		
	µg/kg	Q	PQL
Dibenz[a,h]anthracene	20	U	20
Dibenzofuran	21	U	21
Diethyl phthalate	28	U	28
Dimethyl phthalate	25	U	25
Fluoranthene	38	U	38
Fluorene	19	U	19
Hexachlorobenzene	31	U	31
Hexachlorobutadiene	11	U	11
Hexachlorocyclopentadiene	53	U	53
Hexachloroethane	23	U	23
Indeno(1,2,3-cd)pyrene	23	U	23
Isophorone	18	U	18
N-Nitroso-di-n-dipropylamine	33	U	33
N-Nitrosodiphenylamine	22	U	22
Naphthalene	33	U	33
Nitrobenzene	23	U	23
Pentachlorophenol	350	U	350
Phenanthrene	18	U	18
Phenol	19	U	19
Pyrene	13	U	13

APPENDIX F

DATA QUALITY ASSESSMENT

APPENDIX F

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 2012a). This DQA was performed in accordance with site-specific data quality objectives found in the *100 Area Remedial Action Sampling and Analysis Plan* (SAP) (DOE-RL 2009).

A review of the sample design (WCH 2012b), the field logbook (WCH 2012a), and applicable analytical data packages has been performed as part of this DQA. All samples were collected and analyzed per the sample design. To ensure quality data, the SAP data assurance requirements and the data validation procedures for chemical analysis and radiochemical analysis (BHI 2000a, 2000b) are 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 sample data collected at the 100-D-66 waste site were provided by the laboratories in two sample delivery groups (SDGs): SDG KP0121 and SDG KP0122. SDG KP0121 was submitted for third-party validation. Major deficiencies were identified in this analytical data set and are discussed below. Minor deficiencies for the 100-D-66 data set are discussed by SDG 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.

MAJOR DEFICIENCIES

In the ion chromatography (IC) anions analysis, the holding times for nitrate, nitrite, and orthophosphate in method 300.0 were exceeded by more than twice the limit for SDG KP0121. Third-party validation qualified all undetected nitrate, nitrite, and orthophosphate results as rejected with "UR" flags.

Similarly, the holding times for nitrate, nitrite, and orthophosphate in method 300.0 were exceeded by more than twice the limit for SDG KP0122. The project has qualified these data as rejected with "UR" flags.

These results were anticipated by the project. To obtain usable nitrate and nitrite data, method 353.2 was also run, which has longer allowable holding time. These data effectively replace the rejected method 300.0 nitrate and nitrite data. Orthophosphate is not a regulated compound. Therefore, the resulting data set is sufficient for decision-making purposes.

MINOR DEFICIENCIES

SDG KP0121

This SDG comprises 13 statistical soil samples (J1PXJ0 through J1PXJ9, J1PXK0 through J1PXK2) collected from the 100-D-66 waste site excavation area This SDG includes one field duplicate pair (J1PXK0/J1PXK2). These samples were analyzed for gamma energy analysis (GEA), strontium-90, nickel-63, carbon-14, isotopic uranium, isotopic plutonium, inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, IC ions, nitrate, nitrite, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), and pesticides. SDG KP0121 was submitted for third-party validation. Minor deficiencies are as follows:

In the SVOC analysis, the matrix spike (MS) recovery for 4-chloranaline (40%) is below the quality control (QC) limits. Third-party validation qualified all 4-chloroanaline results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the matrix spike duplicate (MSD) results for 2,4,6-trichlorophenol (45%) and 4-nitrophenol (43%) are below the QC limits. Third-party validation qualified all 2,4,6-trichlorophenol and 4-nitrophenol in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the SVOC analysis, surrogate recoveries in sample J1PXK2 are outside the QC limits. Third-party validation qualified the impacted analytes (2,4-dichlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, pentachlorophenol, bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, bis(2-chloroethoxy)methane, 4-chlorophenyl phenyl ether, 4-bromophenylphenyl ether) as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the relative percent differences (RPDs) calculated between the MS and MSD for the analytes 4-nitrophenol (51%) and 2,4,6-trichlorophenol (31%) are outside the QC limits. Third-party validation qualified all 4-nitrophenol and 2,4,6-trichlorophenol results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the chlorinated pesticide analysis, the analyte toxaphene was not included in the MS, MSD, or laboratory control samples. Toxaphene is actually a mixture of compounds rather than a discrete analyte. While the overall concentration of toxaphene can be calculated using several unobstructed peaks in the chromatography, the inclusion of toxaphene in the spiking mixture would be problematic for the other pesticide analytes. The laboratory typically quantitates toxaphene but does not include toxaphene in quality assurance (QA)/QC samples. Third-party validation qualified the toxaphene results as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recovery for antimony (39.4%) is below the QC range. Third-party validation qualified all of the antimony results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the laboratory control sample (LCS) recoveries for aluminum (146%) and antimony (65.1%) are outside the QC range. Third-party validation qualified all aluminum and antimony results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the PAH analysis, chrysene was detected in the method blank (MB). Third-party validation qualified the chrysene results in samples (J1PXJ4, J1PXJ7, J1PXK0, J1PXK1, J1PXK2) with similar results to the MB as undetected with "U" flags and raised the raised the result to the required quantitation limit. These data are usable for decision-making purposes.

In the isotopic uranium analysis, no LCS was analyzed for uranium-235. Third-party validation qualified all uranium-235 results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the tritium and carbon-14 analyses, no MSs were prepared. Third-party validation qualified all tritium and carbon-14 results in SDG KP0121 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the method 300.0 IC anions analysis, the holding time was exceeded by more than twice the limit for nitrate, nitrite, and orthophosphate. Undetected results for these analytes are discussed in the Major Deficiencies section above. Detected results for these analytes were qualified by third-party validation as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the pH analysis, the holding time was exceeded by more than twice the limit. All pH results were qualified by third-party validation as estimated with "J" flags. Estimated data are usable for decision-making purposes.

SDG KP0122

This SDG comprises 13 statistical soil samples (J1PXK3 through J1PXK9, J1PXL0 through J1PXL5) collected from the 100-D-66 waste site staging pile areas. This SDG includes one field duplicate pair (J1PXL0/J1PXL5). These samples were analyzed for GEA, strontium-90, nickel-63, carbon-14, isotopic uranium, isotopic plutonium, ICP metals, mercury, hexavalent chromium, IC ions, nitrate, nitrite, SVOCs, PAH, PCBs, and pesticides. SDG KP0121 was submitted for third-party validation. Additionally, one equipment blank (EB) is included in this data set. The EB (J1PXL6) was analyzed for ICP metals, mercury, and PAH. Minor deficiencies are as follows:

In the carbon-14 analysis, the RPD calculated for the original and laboratory duplicate samples was above the QC limit at 90%. However, both results were below the RDL and the calculation of the RPD is inappropriate. The data are usable for decision-making purposes.

In the isotopic uranium analysis, the RPD calculated for the original and laboratory duplicate samples was above the QC limit at 50%. However, both results were below the RDL and the calculation of the RPD is inappropriate. The data are usable for decision-making purposes.

In the isotopic uranium analysis, no LCS was analyzed for uranium-235. All uranium-235 results in SDG KP0122 may be considered as estimated. Estimated data are usable for decision-making purposes.

In the tritium and carbon-14 analyses, no MSs were prepared. All tritium and carbon-14 results in SDG KP0122 may be considered estimated. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the RPDs calculated for 2,4,6-trichlorophenol, 2,4-dinitrophenol, and pentachlorophenol between the MS and MSD are above the QC limit at 43%, 52%, and 61%, respectively. Elevated RPDs in environmental samples are generally attributed to natural heterogeneities in the sample matrix. The data are usable for decision-making purposes.

In the PAH analysis, the laboratory has noted a relatively large hit of acenaphthylene in sample J1PXK5. This result cannot be discounted based on method criteria. Based on a small variance in retention time, other large unknown peaks in the chromatogram, and an absence of other similarly large PAH detections, the laboratory maintains a level of doubt about this quantitation. Therefore, the acenaphthylene result for sample J1PXK5 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were outside the project acceptance criteria for four analytes (aluminum, antimony, iron, silicon). For aluminum, iron, manganese, and silicon, the spiking concentration was insignificant compared to the native concentration in the sample from which the MS was prepared. The deficiency in the MS is a reflection of the variability of the native concentration rather than a measure of the recovery from the sample. Antimony did not have mismatched spike and native concentrations in the MS. The MS recovery for antimony is 31.3%. All antimony results for SDG KP0122 may be considered estimated. Estimated data are usable for decision-making purposes.

In the IC anions analysis, the RPDs calculated for chloride and sulfate are above the QC limit at 47.9% and 69.9%, respectively. Elevated RPDs in environmental samples are generally attributed to natural heterogeneities in the sample matrix. The data are usable for decision-making purposes.

In the IC anions analysis, the MS recovery for sulfate is below the QC range at 56.7%. The laboratory notes that the RPD for sulfate was elevated and attribute the deficiency in the MS to the same cause, natural heterogeneities in the sample matrix. The sulfate results for SDG KP0122 may be considered estimated. Estimated data are usable for decision-making purposes.

In the method 300.0 IC anions analysis, the holding time was exceeded by more than twice the limit for nitrate, nitrite, and orthophosphate. Undetected results for these analytes are discussed in the Major Deficiencies section above. Detected results for these analytes may be considered estimated. Estimated data are usable for decision-making purposes.

In the pH analysis, the holding time was exceeded by more than twice the limit. All pH results may be considered estimated. Estimated data are usable for decision-making purposes.

FIELD QUALITY ASSURANCE/QUALITY CONTROL

Relative percent difference 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 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 2012a), are shown in Table F-1. The main and QA/QC sample results are presented in Appendix D.

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

Sample Area	Main Sample	Duplicate Sample
Excavation area	J1PXK0	J1PXK2
Staging pile area	J1PXL0	J1PXL5

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 (COPC). 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 D provides details on duplicate pair evaluation and RPD calculation.

The RPDs calculated for the field duplicate samples are above the acceptance criteria (30%) for the analytes chromium (45.6%) and vanadium (33.6%) in the excavation samples and for barium (34.7%) in the staging pile area. Elevated RPDs in environmental samples are generally attributed to natural heterogeneities in the sample matrix. 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. In these cases, a control limit of ±2 times the TDL is used (Appendix B) to indicate that a visual check of the data is required by the reviewer. No sample results required this check. 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-66 waste site 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-66 waste site 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 Environmental Restoration 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 D.

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