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

12-AMRP-0037

MAY 22 2012

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. 2011-012 AND SUPPORTING DOCUMENTATION FOR THE 116-H-5, 1904-H OUTFALL STRUCTURE, REVISION 0

Attached for your use is the approved Waste Site Reclassification Form No. 2011-012, and supporting "Remaining Sites Verification Package for the 116-H-5, 1904-H Outfall Structure," Rev.0. If you have questions, please contact me or your staff may contact Ellwood Glossbrenner, of my staff, at (509) 376-5828.

Sincerely,

Catherine A. Luna for

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

AMRC:ETG

Attachment

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

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

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-HR-1 **Control No.:** 2011-012

Waste Site Code(s)/Subsite Code(s): 116-H-5, 1904-H Outfall Structure

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 116-H-5, 1904-H Outfall Structure was a liquid waste site that operated from 1949 to 1965 as a weir box to discharge 105-H Reactor coolant water and process sewer waste to the Columbia River, and to provide overflow capability in case the outfall discharge pipelines became plugged or received too much flow. The 116-H-5 outfall received effluent via the 100-H-21, 100-H Reactor Cooling Water Effluent Underground Pipelines from the 116-H-7, 107-H Retention Basin and the 100-H-42 process sewer pipelines from the 1906-H Drainage Lift Station.

Remediation, verification sampling, and comparison of residual contaminant concentrations against cleanup levels have been performed in accordance with remedial action objectives (RAOs) and remedial action goals (RAGs) established by the *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-96-17, Rev. 6, U.S. Department of Energy, Richland, Washington 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), U.S. Environmental Protection Agency, Region 10, Seattle, Washington. 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 the Environmental Restoration Disposal Facility at the 200 Area of the Hanford Site, (3) demonstrating through verification sampling that cleanup goals have been achieved, and (4) proposing the site for reclassification as Interim Closed Out.

Basis for reclassification:

The verification sampling and/or modeling results for the 116-H-5, 1904-H Outfall Structure demonstrate that this site meets the RAOs and corresponding RAGs established in the Remaining Site ROD, except for lead and PAHs in the deep zone. The sample and modeling results demonstrate that residual contaminant concentrations do not preclude any future land uses (as bounded by a rural-residential scenario), and allow for unrestricted future use of shallow-zone soils (i.e., surface to 4.6 m [15 ft]). The sample and modeling results also show that contaminant levels remaining in the soil are protective of groundwater and the Columbia River, except for lead and PAHs in the deep zone. The basis for reclassification, including supplemental evaluation demonstrating protectiveness for lead and PAHs in the deep zone, is described in detail in the *Remaining Sites Verification Package for the 116-H-5, 1904-H Outfall Structure* (attached).

Regulator Comments:

Approval of this WSRF documents regulator agreement that the 116-H-5 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 RECLASSIFICATION FORM

Operable Unit: 100-HR-1 **Control No.:** 2011-012

Waste Site Code(s)/Subsite Code(s): 116-H-5, 1904-H Outfall Structure

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		5/3/12
DOE Federal Project Director (printed)	Signature	Date
N. Menard	Nina M. Menard	5/3/12
Ecology Project Manager (printed)	Signature	Date
N/A		
EPA Project Manager (printed)	Signature	Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 116-H-5, 1904-H OUTFALL STRUCTURE

Attachment to Waste Site Reclassification Form 2011-012

June 2011

REMAINING SITES VERIFICATION PACKAGE FOR THE 116-H-5, 1904-H OUTFALL STRUCTURE

EXECUTIVE SUMMARY

The 116-H-5, 1904-H Outfall Structure, part of the 100-HR-1 Operable Unit, was a liquid waste site that operated from 1949 to 1965, as a weir box to discharge 105-H Reactor coolant water and process sewer waste to the Columbia River, and to provide overflow capability in case the outfall discharge pipelines became plugged or received too much flow. The 116-H-5 outfall received effluent via the 100-H-21, 100-H Reactor Cooling Water Effluent Underground Pipelines from the 116-H-7, 107-H Retention Basin and the 100-H-42 process sewer pipelines from the 1906-H Drainage Lift Station. Water flowed from the outfall structure and discharged to the Columbia River via the 100-H-34, 100-H River Effluent Pipelines. In the event that the river effluent pipelines became plugged or received too much flow, effluent would back up into the outfall structure and overflow into the 100-H-36 underground concrete spillway that discharged directly to the river (BHI 1995).

Remedial action at the 116-H-5 waste site began on November 17, 2008, and continued through April 9, 2009, to a depth of approximately 7 m (23 ft) on the eastern side of the excavation and 13 m (43 ft) on the western side of the excavation. The excavation resulted in approximately 2,510 bank cubic meters (BCM) (3,283 bank cubic yards [BCY]) of contaminated soil and debris being removed for disposal at the Environmental Restoration Disposal Facility (ERDF). Approximately 15,696 BCM (20,529 BCY) of overburden material was stockpiled southwest of the excavation for use as clean backfill. Columnar basalt riprap boulders, cemented together and used as a retaining wall, were also excavated from the site and will be used as backfill. Most of the soil was direct loaded from the excavation; however, small staging pile areas were used for pipe, concrete, and fence material, which were later loaded out and disposed at the ERDF.

Several pipelines that discharged to or from the 116-H-5, 1904-H Outfall Structure remain at the site. A 183-cm (72-in.) reinforced concrete pipe (part of the 100-H-42, 1906-H Drainage Lift Station waste site that transferred effluent from the 1906-H Building to the 116-H-5 outfall) remains near the base of the western sidewall of the 116-H-5 excavation. The 100-H-36 spillway and the 100-H-34, 100-H River Effluent Pipelines that discharged effluent from the outfall structure to the river also remain.

Following site remediation, verification sampling was conducted May 13 through 18, 2010. The results of the verification sampling indicated that some sample locations in every decision unit had results that exceeded the cleanup criteria. As a result, additional excavation was performed to remove contaminated soils. Additional samples were subsequently collected on March 16, 2011 from the original failed locations except for the staging pile area, which had a new sample design implemented because the original boundary had been altered during the additional remediation. These samples showed exceedances in the deep zone decision unit and additional remediation was again conducted for the deep zone locations that exceeded cleanup criteria. Following this third remediation campaign, verification sampling of the failed locations was conducted on April 13, 2011. The results indicate that remedial action objectives (RAOs) and

remedial action goals (RAGs) for direct exposure, protection of groundwater, and protection of the Columbia River have been met.

A summary of the cleanup evaluation for the soil results against the applicable criteria is presented in Table ES-1. The results of the verification sampling and modeling are used to make a reclassification decision for the 116-H-5 waste site in accordance with the TPA-MP-14 procedure in the *Tri-Party Agreement Handbook Management Procedures* (DOE-RL 2007).

Table ES-1. Summary of Remedial Action Goals for the 116-H-5 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain dose rate of <15-mrem/yr dose rate above background over 1,000 years.	Maximum dose rates from sum of fractions evaluations for the excavation using individual radionuclide dose-equivalent lookup values are <15 mrem/yr. The maximum predicted cumulative dose rate for the excavation is 4.88 mrem/yr.	Yes
Direct Exposure – Nonradionuclides	Attain individual COPC RAGs.	All individual COC/COPC concentrations are below the direct exposure criteria.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of <1 for all individual noncarcinogens.	The hazard quotients for individual nonradionuclide COCs/COPCs are <1.	Yes
	Attain a cumulative hazard quotient of <1 for noncarcinogens.	The cumulative hazard quotient (1.2×10^{-2}) is <1.	
	Attain an excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	The excess cancer risk for carcinogens is $<1 \times 10^{-6}$.	
	Attain a cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	The total excess cancer risk (1.0×10^{-6}) is $<1 \times 10^{-5}$.	
Groundwater/River Protection – Radionuclides	Attain single COPC groundwater and river protection RAGs.	The residual concentration of technetium-99 exceeded the soil RAG for the protection of groundwater. However, site-specific RESRAD modeling predicts that residual concentrations of this constituent will be protective of groundwater[a].	Yes
	Attain national primary drinking water regulations [b]: 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.	Only technetium-99 was quantified above groundwater/river protection soil lookup values. Site-specific RESRAD modeling predicts that residual concentrations of this constituent will attain national primary drinking water regulations.	
	Meet drinking water standards for alpha emitters: the more stringent of 15 pCi/L MCL or 1/25th of the derived concentration guide from DOE Order 5400.5 [c].	Activity of alpha-emitting radionuclide COPCs detected above background is less than lookup values.	
	Meet total uranium standard of 30 µg/L (21.2 pCi/L) [d].	Uranium was not quantified above background levels for this site.	

Table ES-1. Summary of Remedial Action Goals for the 116-H-5 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 lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, 4,4'-DDE, 4,4'-DDT, and total PCBs exceeded the soil RAGs for the protection of groundwater and/or the Columbia River. However, RESRAD modeling predict that residual concentrations of these constituents will be protective of groundwater and the river, except for lead and PAHs in the deep zone [e]. Supplemental evaluation was used to demonstrate protectiveness for residual lead and PAHs in the deep zone [f, g].	Yes

[a] Based on RESRAD modeling , residual soil concentrations of technetium-99 are predicted to be protective of groundwater (Appendix C).

[b] "National Primary Drinking Water Regulations" (40 CFR 141).

[c] *Radiation Protection of the Public and the Environment* (DOE Order 5400.5).

[d] Based on the isotopic distribution of uranium in the Hanford Site background, the 30 μg/L uranium MCL (40 CFR 141.66) 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 2001a).

[e] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentrations of lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, 4,4'-DDE, 4,4'-DDT, and total PCBs in the shallow-zone excavation, overburden soil stockpile, and waste staging pile area footprint are not expected to migrate more than 1.8 m (6.0 ft) vertically in 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for lead). The vadose zone underlying the soil below the shallow zone decision unit is approximately 7.0 m (23.0 ft) in depth. The vadose zone underlying the final placement location of the overburden soil stockpile decision unit is at least 2.0 m (6.6 ft) in depth. The vadose zone underlying the staging pile area decision unit is approximately 11.0 m (36.0 ft) in depth. The vadose zone underlying the deep zone decision unit is 0.0 m (0.0 ft) in depth because portions of the deep zone excavation had groundwater intrusion at times of high river flows. As such, RESRAD modeling was not used to demonstrate protectiveness for lead and PAHs in the deep zone.

[f] Based on sediment sampling within the Columbia River riparian zone (PNNL 2003, BHI 2005, and DOE-RL 2010) it has been determined that lead values for the 116-H-5 waste site within the deep zone decision unit is consistent with these riparian zone lead concentrations. Therefore, the lead concentrations do not represent additional contamination from the 116-H-5 waste site.

[g] The K_d values for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are extremely high (the lowest K_d value being 360 mL/g for benzo(a)anthracene) and would not be expected to partition from the soil column into the groundwater within the deep zone excavation. These contaminants were not detected in downstream river sediment samples collected for the River Corridor Baseline Risk Assessment.

COC = contaminant of concern
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
MCL = maximum contaminant level
RAG = remedial action goal
RDR/RAWP = *Remedial Design Report/Remedial Action Work Plan of the 100 Area*
RESRAD = RESidual RADioactivity (dose model)
UCL = upper confidence limit

In accordance with this evaluation, the verification sampling, modeling results, and supplemental evaluations support a reclassification of this site to Interim Closed Out. The current site conditions achieve the RAOs and the corresponding RAGs established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (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 (including consideration of modeling) also demonstrate that residual contaminant concentrations are

protective of groundwater and the Columbia River except for lead and PAHs in the deep zone. Supplemental evaluation demonstrates protectiveness for lead and PAHs in the deep zone.

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 116-H-5 waste site contaminants of potential concern and other constituents. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for antimony, lead, manganese, vanadium, zinc, and DDT/DDD/DDE (total). Ecological screening levels from *Washington Administrative Code* 173-340 were exceeded for arsenic, boron, and vanadium. Exceeding screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. Because concentrations of antimony, manganese, vanadium, and zinc are below Hanford Site or Washington State background values (note that state background values are only used when Hanford Site background values are not available), it is believed that the presence of these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

REMAINING SITES VERIFICATION PACKAGE FOR THE 116-H-5, 1904-H OUTFALL STRUCTURE

STATEMENT OF PROTECTIVENESS

This report demonstrates that the 116-H-5, 1904-H Outfall Structure waste site meets the objectives for Interim Closed Out as established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2009b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) (EPA 1999). The verification sample and modeling results 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 (including consideration of modeling) also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River except for lead and PAHs in the deep zone. Supplemental evaluation demonstrates protectiveness for lead and PAHs in the deep zone.

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 116-H-5 waste site contaminants of potential concern and other constituents (Appendix A). The U.S. Environmental Protection Agency (EPA) ecological soil screening levels were exceeded for antimony, lead, manganese, vanadium, zinc, and DDT/DDD/DDE (total). Ecological screening levels from *Washington Administrative Code* 173-340 were exceeded for arsenic, boron, and vanadium. Exceeding screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. Because concentrations of antimony, manganese, vanadium, and zinc are below Hanford Site or Washington State background values (note that state background values are only used when Hanford Site background values are not available), it is believed that the presence of these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

GENERAL SITE INFORMATION AND BACKGROUND

The 116-H-5, 1904-H Outfall Structure, part of the 100-HR-1 Operable Unit, was located northeast of the 105-H Reactor Building and north of the 116-H-7, 107-H Retention Basin on the Columbia River shoreline (Figure 1). The slope between the outfall and the riverbank was covered with large basalt riprap boulders that were mortared in place, extending about 73 m (240 ft) north and south of the outfall structure (Figure 2).

Figure 1. The 116-H-5 Waste Site Location Map.

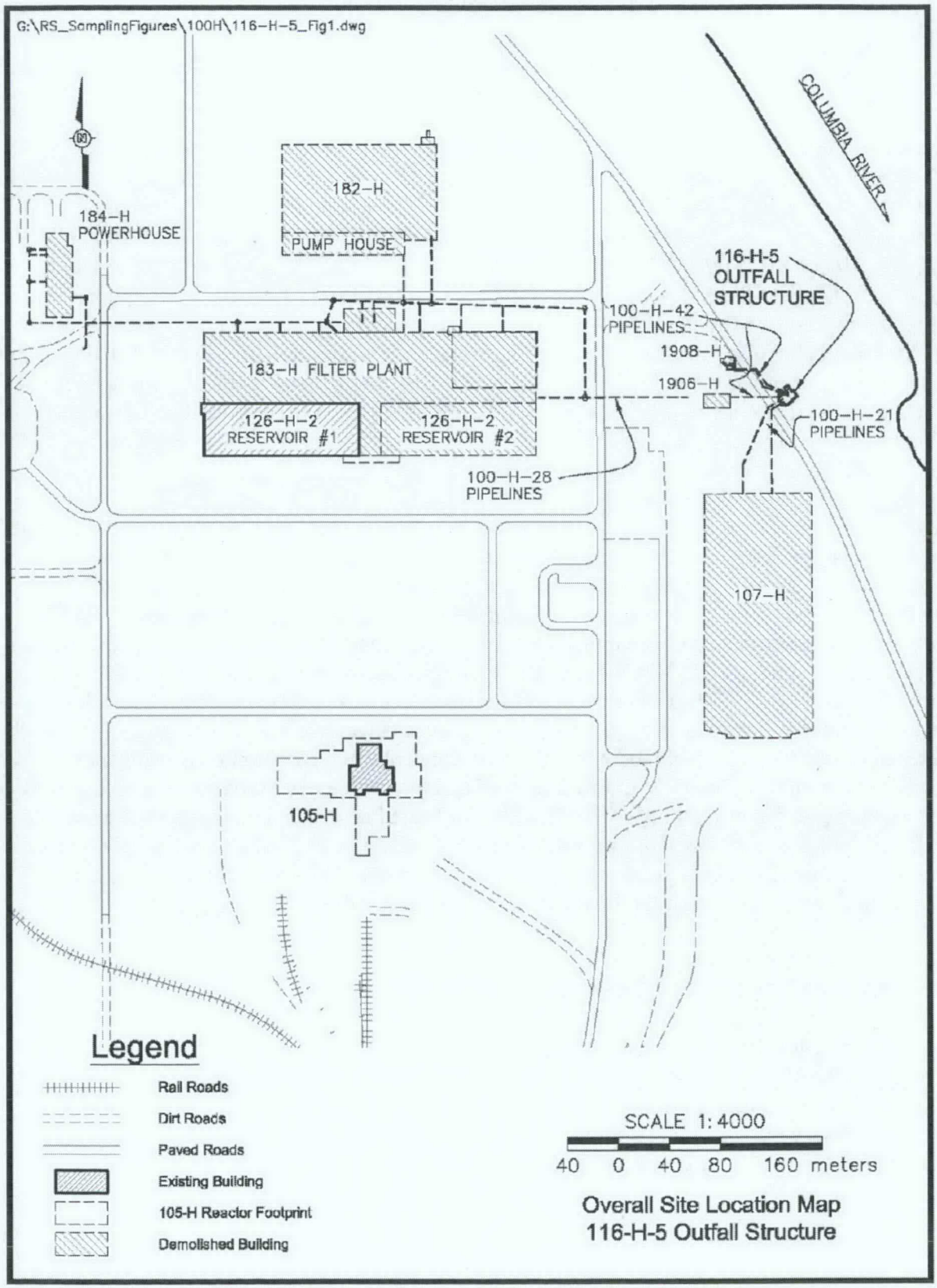
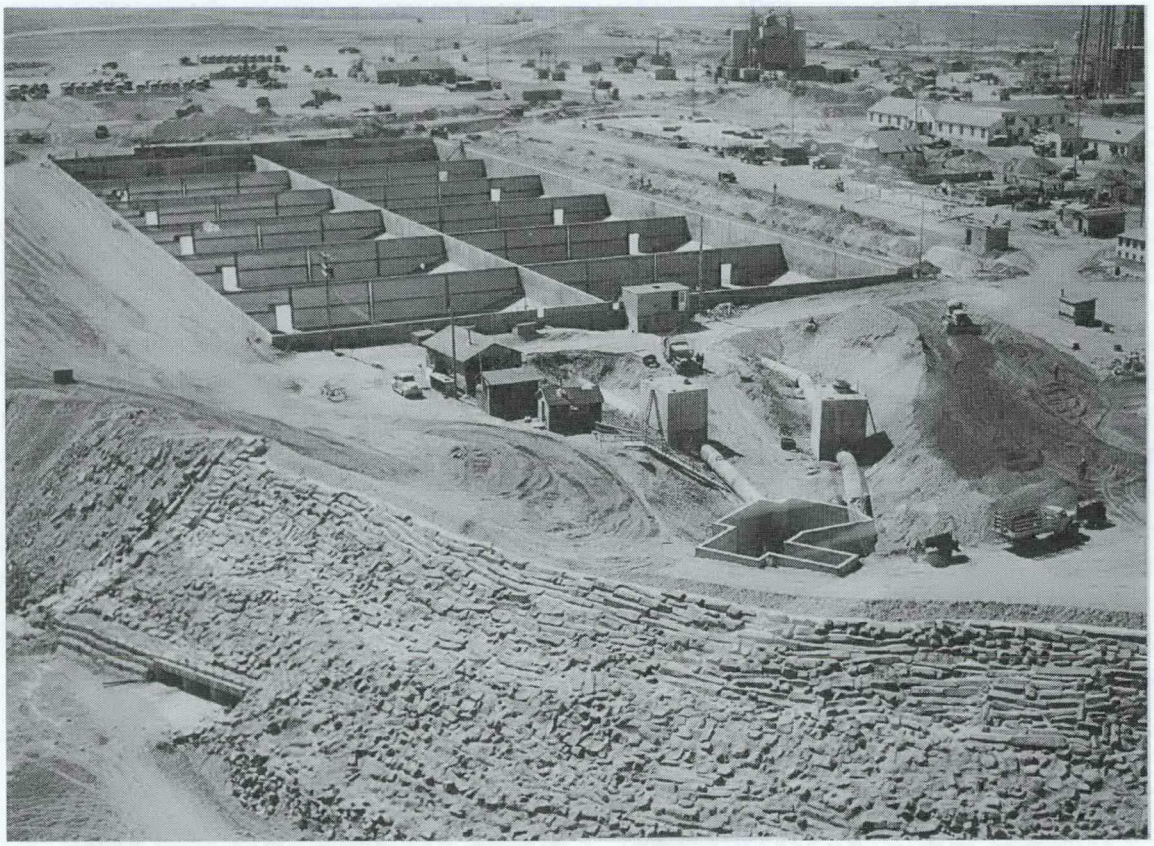


Figure 2. Undated Photograph of the Construction of the 116-H-5 Outfall Structure.



The 116-H-5, 1904-H Outfall Structure was a liquid waste site that operated from 1949 to 1965, as a weir box to discharge 105-H Reactor coolant water and process sewer waste to the Columbia River. The 116-H-5 outfall received effluent via the 100-H-21, 100-H Reactor Cooling Water Effluent Underground Pipelines from the 116-H-7, 107-H Retention Basin and the 100-H-42 process sewer pipelines from the 1906-H Drainage Lift Station. The 100-H-28:2 pipelines fed into the 1906-H Drainage Lift Station. A 6-in.-diameter steel effluent sample line and an 8-in.-diameter steel sample drain line, both a part of the 100-H-42 pipelines, extend between the outfall and the 1908-H Effluent Monitoring Station. Water flowed from the outfall structure and discharged to the Columbia River via the 100-H-34, 100-H River Effluent Pipelines. In the event that the outfall river effluent pipelines became plugged or received too much flow, effluent would back up into the outfall structure and overflow into the 100-H-36 underground concrete sluiceway that led to the river (BHI 1995).

REMEDIAL ACTION SUMMARY

Remedial action at the 116-H-5 waste site began on November 17, 2008, and continued through April 9, 2009, to a depth of approximately 7 m (23 ft) on the eastern side of the excavation and 13 m (43 ft) on the western side of the excavation. The excavation resulted in approximately 2,510 bank cubic meters (BCM) (3,283 bank cubic yards [BCY]) of contaminated soil and debris

being removed for disposal at the Environmental Restoration Disposal Facility (ERDF). Approximately 15,696 BCM (20,529 BCY) of overburden material was stockpiled southwest of the excavation for use as clean backfill. The overburden material, including the installed riprap along the river slope was excavated up to the concrete outfall structure walls. Most of the contaminated soil was direct loaded from the excavation; however, small staging pile areas were used for pipe, concrete, and fence material, which were later loaded out and disposed at the ERDF. The post remediation topography map is presented in Figure 3.

Several pipelines that discharged to or from the 116-H-5, 1904-H Outfall Structure remain at the site. A 183-cm (72-in.) reinforced concrete pipe that transferred effluent from the 1906-H Building to the 116-H-5 outfall remains near the base of the western sidewall of the 116-H-5 excavation (Figure 4). The pipeline is part of the 100-H-42, 1906-H Drainage Lift Station waste site and will be remediated at a later date (WCH 2009). Two small-diameter pipelines, also a part of the 100-H-42 waste site, that extended between the 1908-H Effluent Monitoring Station and the outfall were removed during the 116-H-5 excavation. The 100-H-36 spillway, shown as three square openings on the left side of Figure 4 and on the right side of Figure 5, and the 100-H-34 river effluent pipelines (middle of Figure 5) remain. The 100-H-34 river effluent pipelines have been capped as shown in Figures 6 and 7.

Columnar basalt riprap boulders, cemented together and used as a retaining wall, were also excavated from the site and will be used as backfill. The basalt riprap was installed along the river slope near the outfall structure to prevent erosion of the slope during high river levels. There is no evidence or historical information that would indicate the basalt riprap was contaminated during operation due to spills. Radiological surveys were conducted during the removal of the riprap and no contamination was detected.

The debris removed from the 116-H-5 waste site was consistent with that of an outfall structure and consistent with the pre-excavation geophysical survey findings. No anomalies were discovered during the remediation.

A Global Positioning Environmental Radiological Surveyor (GPERS) survey was conducted within the 116-H-5 excavation upon completion of remedial action activities. The gamma radiation survey was performed to determine the amount of gamma radiological contamination present after excavation. This post-excavation survey conducted on May 11, 2009, identified no residual gamma radioactivity within the site. Portions of the 100-H-36 spillway, 100-H-42 pipeline, and the 100-H-34 River Effluent Pipeline structures remain in the 116-H-5 waste site; therefore, it was not possible to perform a GPERS survey over the entire surface of the site (Figure 8). All accessible areas were surveyed. Gamma GPERS surveys were conducted on the overburden pile at various times during overburden removal. The overburden removal occurred in several lifts of approximately 1.8 to 3 m (6 to 10 ft) at a time. No gamma radiological contamination was identified within the overburden as indicated on Figures 9, 10, and 11.

Figure 3. 116-H-5 Post Remediation Topography Map.

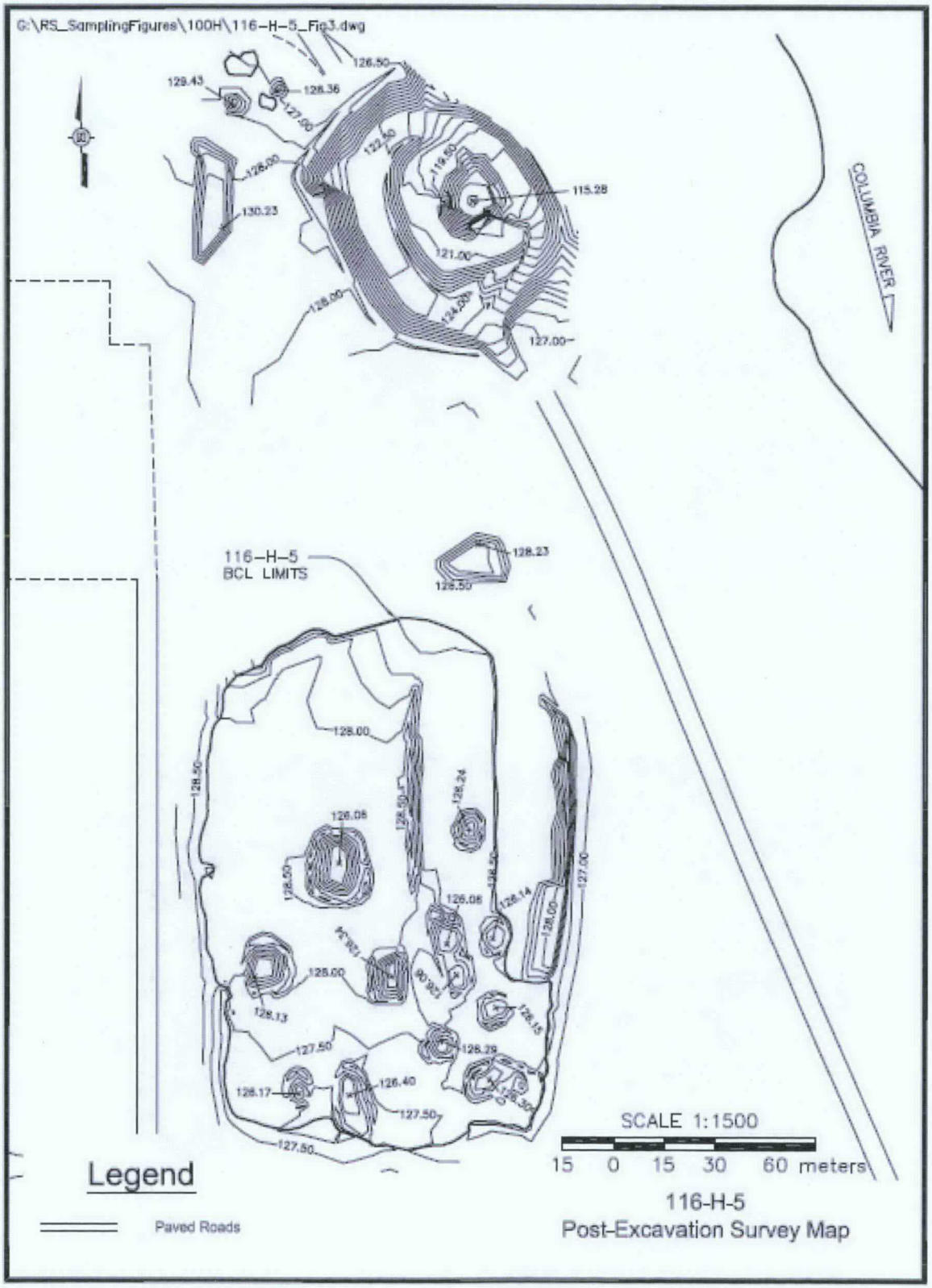


Figure 4. Photograph of the 100-H-42 Pipeline and 100-H-36 Spillway Remaining in the 116-H-5 Excavation.

Figure 5. Photograph of the 100-H-34 River Effluent Pipelines Remaining in the 116-H-5 Excavation.

Figure 6. Photograph of the 100-H-34 River Effluent Pipeline Forms.

Figure 7. Photograph of the Capped 100-H-34 River Effluent Pipelines.

Figure 8. 116-H-5 GPERS Radiological Survey Gamma Track Map.

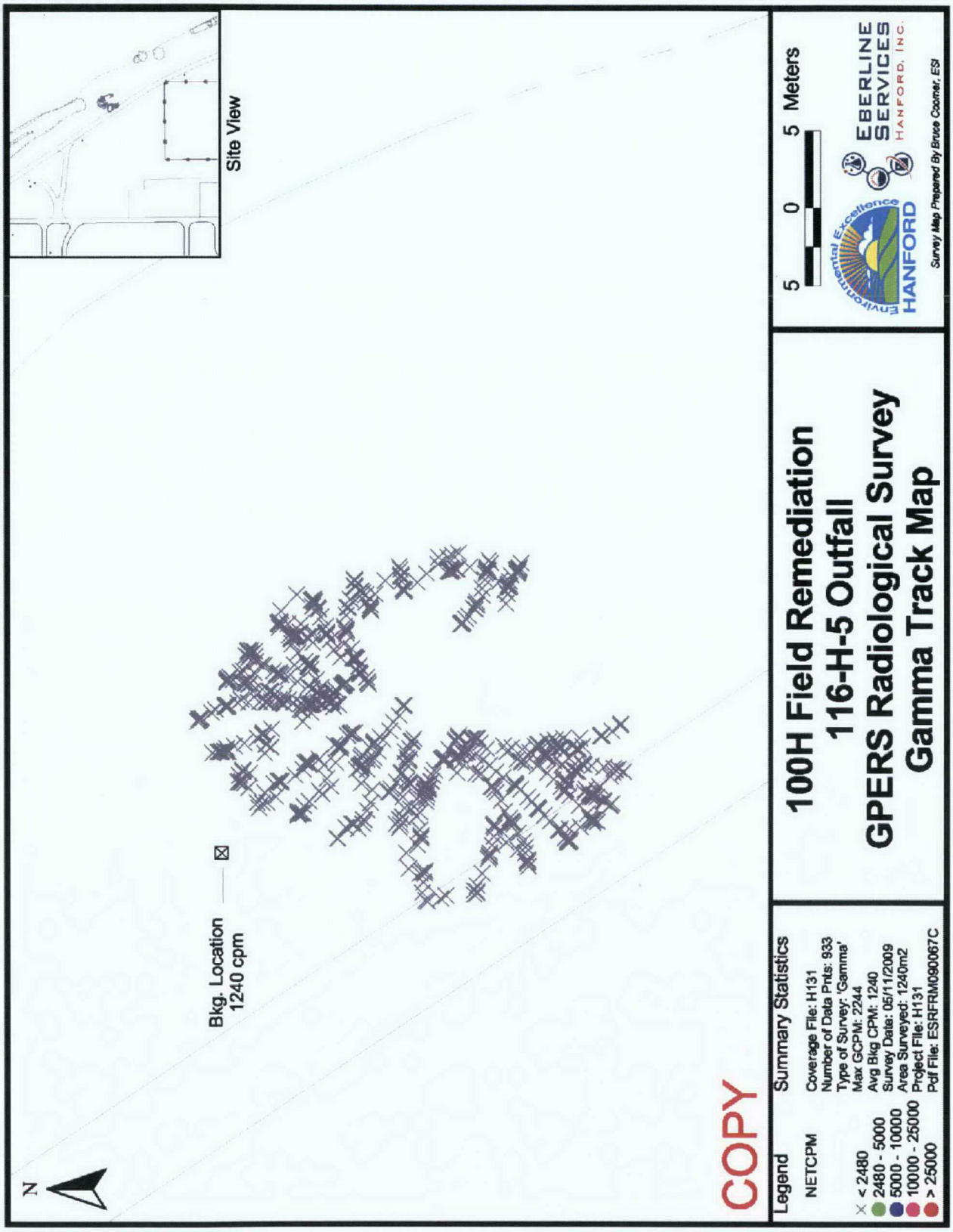


Figure 9. 116-H-5 Overburden GPERS Radiological Survey Gamma Track Map (January 14, 2009).

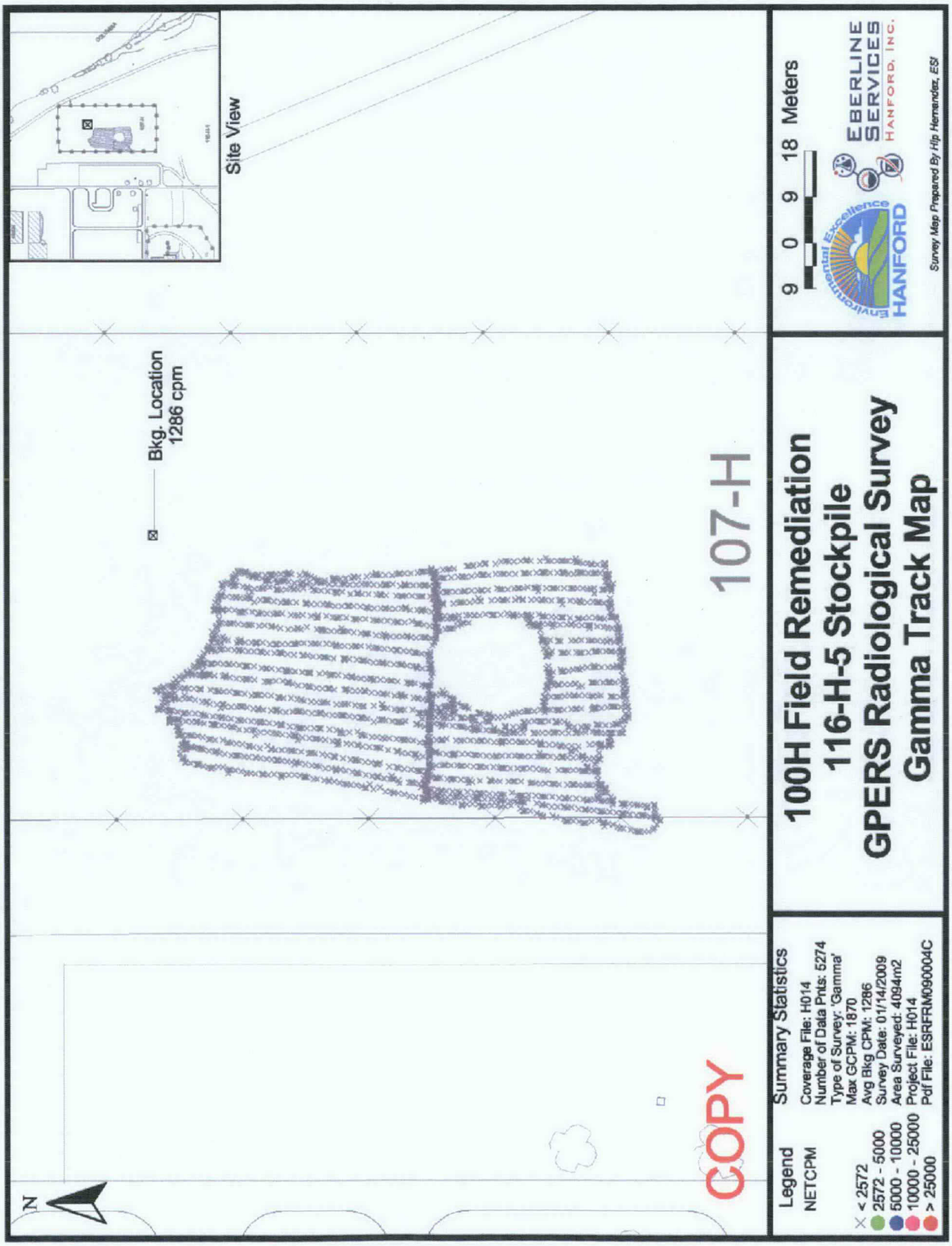


Figure 10. 116-H-5 Overburden GPERS Radiological Survey Gamma Track Map (January 21, 2009).

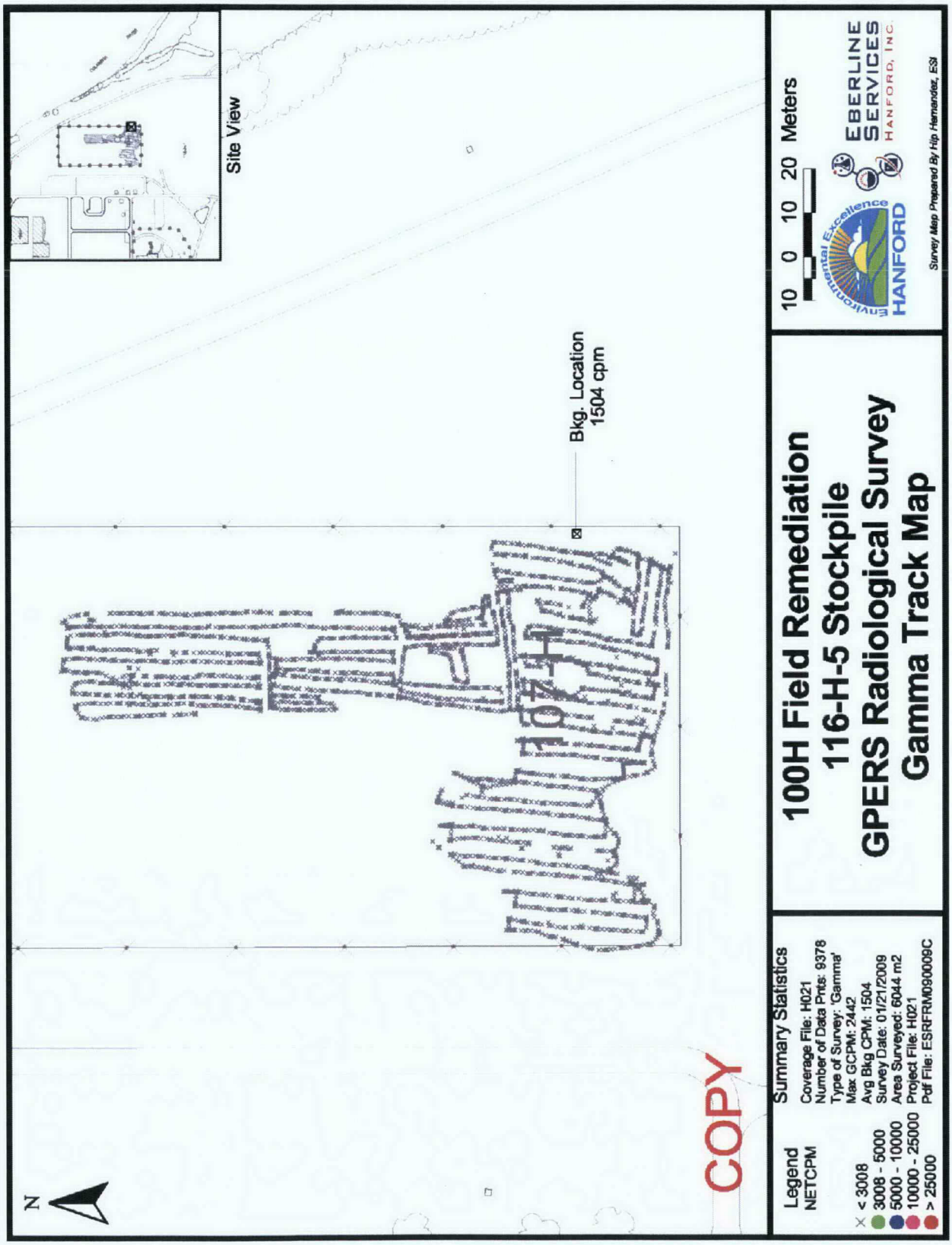
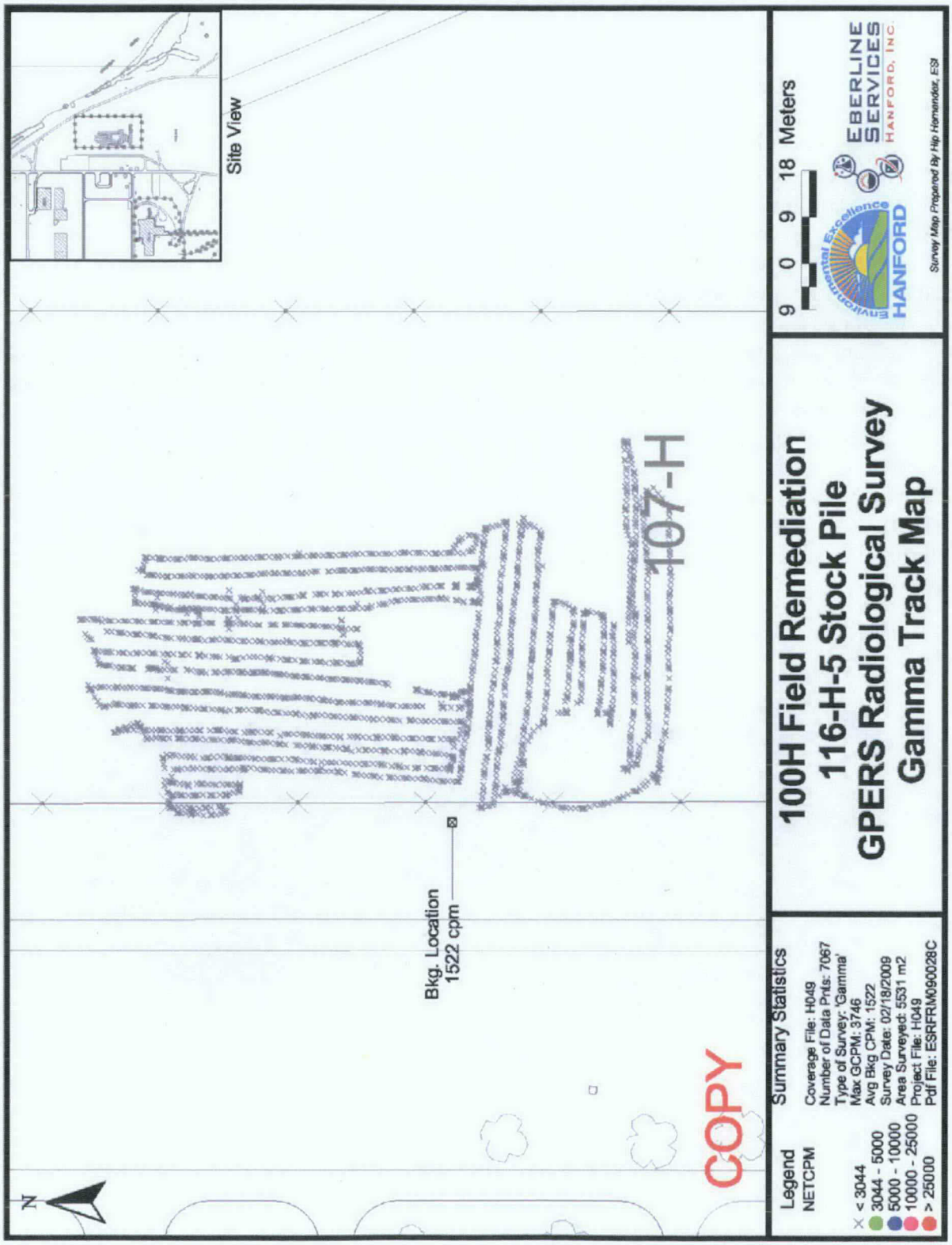


Figure 11. 116-H-5 Overburden GPERS Radiological Survey Gamma Track Map (February 18, 2009).



Additional Remediation

Following sample analysis of the original excavation, it was determined that additional remediation was needed because some sample locations exceeded cleanup criteria for some ICP metals, SVOCs, PAHs, pesticides, and PCBs. This extra remediation, with agreement from the Washington State Department of Ecology, was conducted from February 11 through March 15, 2011. Approximately 5,813.8 BCM (7,604.2 BCY) of additional soil was removed from areas that exceeded direct exposure and/or groundwater and river protection RAGs in the shallow-zone excavation, deep-zone excavation, and overburden soil stockpile. The removal of extra material from these decision units did not change the original boundary for the areas and the original sample design was utilized. Due to the number of deep zone sample locations that exceeded the RAGs, with concurrence from Ecology (WCH 2011c), the entire deep zone decision unit was excavated and sampled again with a reduced contaminant of potential concern (COPC) list including inductively coupled plasma (ICP) metals, mercury, semivolatile organic compounds (SVOCs), and polycyclic aromatic hydrocarbons (PAH) analysis. Sample results for the original deep zone decision unit are included in Appendix B. Samples within the staging area footprints 1, 3, and 4 also exceeded direct exposure RAGs and needed to be remediated and resampled. The footprint for area 1 was widened due to debris being present outside the original area boundary. Area 2 does not appear to have been used as a waste staging pile area as the site appears to be undisturbed (Figure 12). Additionally, all sample results from area 2 were below the RAGs. As a result, a new sample design was implemented for the waste staging pile footprint that excluded area 2. Sample results for the original staging pile area decision unit are included in Appendix B.

Figure 12. Staging Pile Footprint of Unutilized Area 2 (July 15, 2010).

Following the second sample analysis, it was determined that additional remediation was still required because some sample locations within the deep zone decision unit exceeded cleanup criteria for some ICP metals, SVOCs and PAHs. This extra remediation was conducted on April 11 and 12, 2011. Approximately 658.6 BCM (861.4 BCY) of additional soil was removed from areas that exceeded groundwater and river protection RAGs in the deep zone decision unit (Figure 13). No samples exceeded direct exposure cleanup criteria. Additional remediation did not occur at one location that exceeded the groundwater and river protection cleanup criteria for lead because of the close proximity of the sample location to the 100-H-42 pipeline that enters the outfall excavation. This location will be included in the remediation of the 100-H-42, 1906-H Drainage Lift Station at a future date. The removal of extra material from this decision unit did not change the original boundary for the deep zone, and the original sample design with the second sampling campaign COPC list was utilized.

Figure 13. Completion of Additional Remediation Effort at the Outfall (May 18, 2011).

Due to sample results for the overburden soil stockpiles exceeding cleanup criteria for protection of groundwater and the river, the use of overburden for backfill will be restricted to the upper portion of the excavation, at a depth supported by modeling. It is estimated that a minimum 2-m (6.6-ft)-thick layer of clean borrow material will be placed into the excavation from the base to an elevation of 120 m AMSL prior to use of overburden soil for backfill, to account for 2 m of clean fill above the historical groundwater high fluctuation elevation of 118 m AMSL. This 2.0 m (6.6 ft) layer is based on the lowest distribution Kd value (lead of 30 mL/g) of the

contaminants exceeding RAGs in the overburden decision unit. Based on this Kd value, contaminants are not expected to migrate more than 1.8 m (6.0 ft) vertically, in 1,000 years based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b). Therefore, a 2.0 m (6.6 ft) vadose zone layer is protective of groundwater and the Columbia River.

VERIFICATION SAMPLING ACTIVITIES

Statistical verification sampling was conducted at the 116-H-5 waste site on May 13 through 18, 2010 (WCH 2011a), to support a determination that residual contaminant concentrations in the soil meet cleanup criteria specified in the RDR/RAWP (DOE-RL 2009b) and the Remaining Sites ROD (EPA 1999). A statistical sampling design was used to collect verification soil samples from the 116-H-5 excavation and the overburden soil stockpile to support closeout of the waste site. The following subsections provide additional discussion of the information used to develop the verification sampling design. The verification sample results, provided in Appendix D, indicate that the waste removal action achieved compliance with the remedial action objectives (RAOs) for the site.

Additional verification sampling was conducted at the 116-H-5 waste site on March 16, 2011, following the second remediation campaign of the failed locations (WCH 2011a). Further verification sampling was also conducted on April 13, 2011 following the third remediation campaign of failed sample locations (WCH 2011b).

Contaminants of Concern/Contaminants of Potential Concern

The contaminants of potential concern (COPCs) for the 116-H-5 outfall structure, specified in the *100 Area Remedial Action Sampling and Analysis Plan* (SAP) (DOE-RL 2009a), are identified as americium-241, carbon-14, cobalt-60, cesium-137, europium-152, europium-154, europium-155, tritium, nickel-63, plutonium-238, plutonium-239/240, strontium-90, technetium-99, uranium-234, uranium-235, uranium-238, chromium (total), chromium VI, mercury, and lead. Based on process knowledge and analyses of shallow and deep-zone soil samples at the 116-H-7 retention basin (BHI 2001b), it is also appropriate to include arsenic and polychlorinated biphenyls (PCBs) on the list of COPCs for the 116-H-5 waste site. Semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), pesticides, and ion chromatography (IC) anions were added as COPCs, as they were detected in the 100-H-28:2 pipeline confirmatory samples (WCH 2006).

Although not considered COPCs, antimony, barium, beryllium, boron, cadmium, cobalt, copper, magnesium, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc were evaluated by performing analyses for the constituents of the expanded inductively coupled plasma (ICP) metals lists.

After the initial sampling campaign, a second remediation and sampling campaign was needed to remove areas with values that exceeded the cleanup criteria. With Ecology concurrence

(WCH 2011c), the original COPC lists were then utilized for all re-sampled areas except for the deep zone decision unit in which only ICP metals, mercury, SVOCs, and PAH were analyzed.

After the second sampling campaign, additional remediation was again needed to remove areas with values that exceeded the cleanup criteria in the deep zone decision unit. All remediated areas were re-sampled using the original sample design and the COPC list from the second sampling campaign of the deep zone.

Verification Sample Design

This section describes the basis for selection of the sample design and determination of the number of verification samples. The 116-H-5 waste site was divided into four decision units for verification sampling: the shallow-zone excavation, the deep-zone excavation, the overburden soil stockpile, and the staging pile area footprint. A global positioning survey was used to determine the boundaries of the shallow- and deep-zone excavation, the overburden soil stockpile, and the staging pile area footprint requiring soil verification sampling, and the statistical sampling designs for each were prepared using Visual Sample Plan[1] (VSP). A triangular grid is used based on studies that indicate triangular grids are superior to square grids (Gilbert 1987). Additional details concerning the use of VSP to develop the statistical sampling design and derive the number of verification samples to collect are discussed in Appendix B of the verification work instruction (WCH 2010).

Twelve verification soil samples were collected from the shallow-zone excavation including one duplicate (Figure 14). Twelve verification soil samples were collected from the deep-zone excavation including one duplicate (Figure 15). Sample location 7 within the deep zone was located beneath standing water. Therefore, the sample had to be moved 0.66 (2.0 ft) south and 1.9 m (6.5 ft) east to be adequately sampled. Fifteen verification soil samples were collected from the overburden soil stockpile including 1 duplicate (Figure 16). Fifteen were chosen to encompass all 5 overburden areas. Also, 12 verification soil samples were collected from the staging pile area footprint including 1 duplicate (Figure 17). One equipment blank was collected to verify the cleanliness of equipment and supplies used for sample collection.

Portions of the deep zone were not accessible due to concrete-encased pipes reinforced with rebar (as shown in Figures 4 and 5) and were excluded from the sample design. Additionally, portions of the southern-most overburden soil stockpile were excluded from the sample design due to mud dauber contamination. Overburden soil was not deposited in areas identified as mud dauber contamination areas.

The verification data from the decision units was evaluated using the 95% upper confidence limit (UCL) on the true population mean for residual concentrations of COPCs as specified by the RDR/RAWP (DOE-RL 2009b). These calculations are provided in Appendix D. When a nonradionuclide COPC was detected in fewer than 50% of the verification samples collected, the maximum detected value was used for comparison against the RAGs. If no detections for a given COPC were reported in the data set, then no statistical evaluation or calculations were performed for that COPC.

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

Figure 14. 116-H-5 Excavation Shallow Zone Sample Locations.

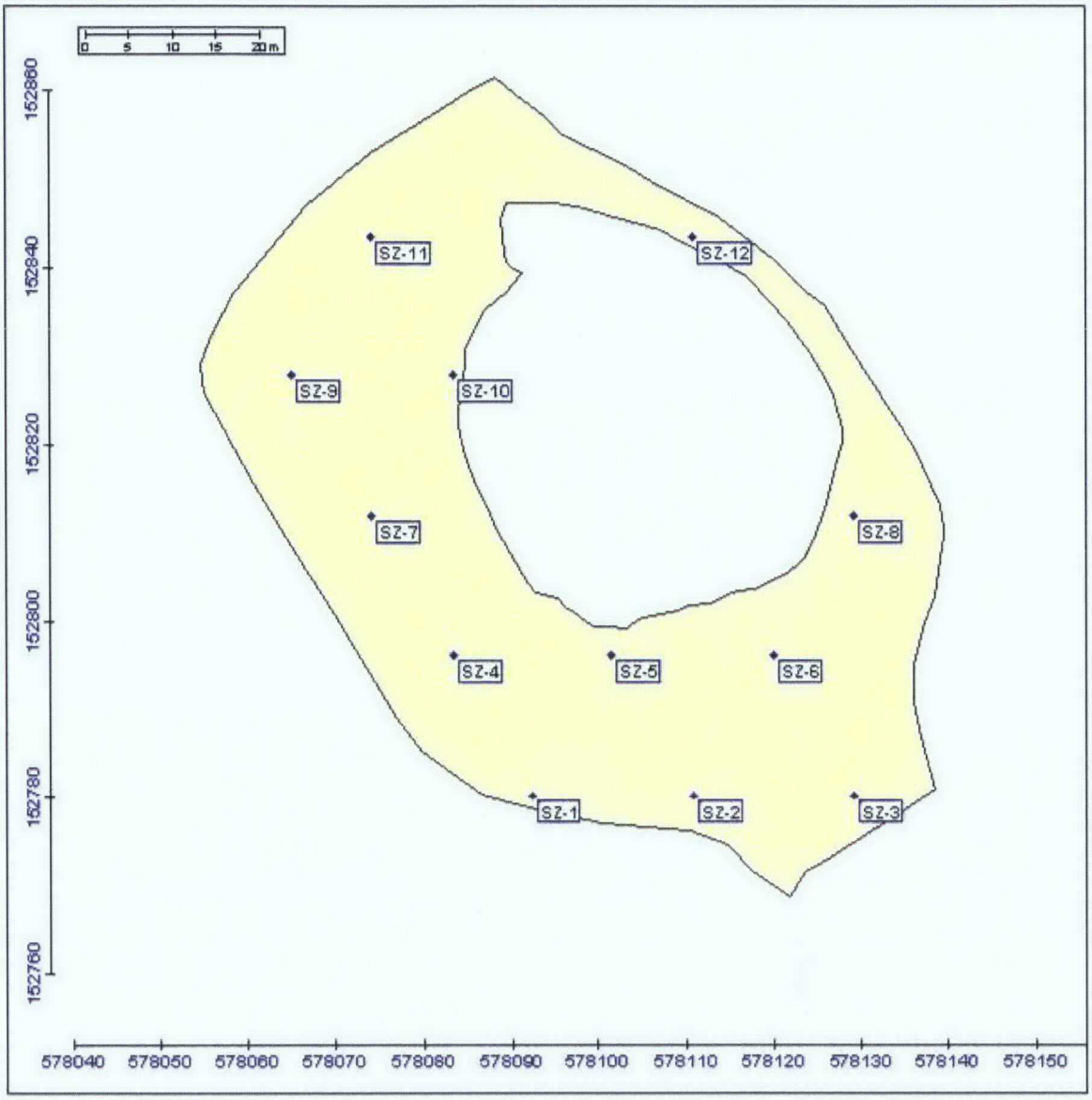


Figure 15. 116-H-5 Excavation Deep Zone Sample Locations.

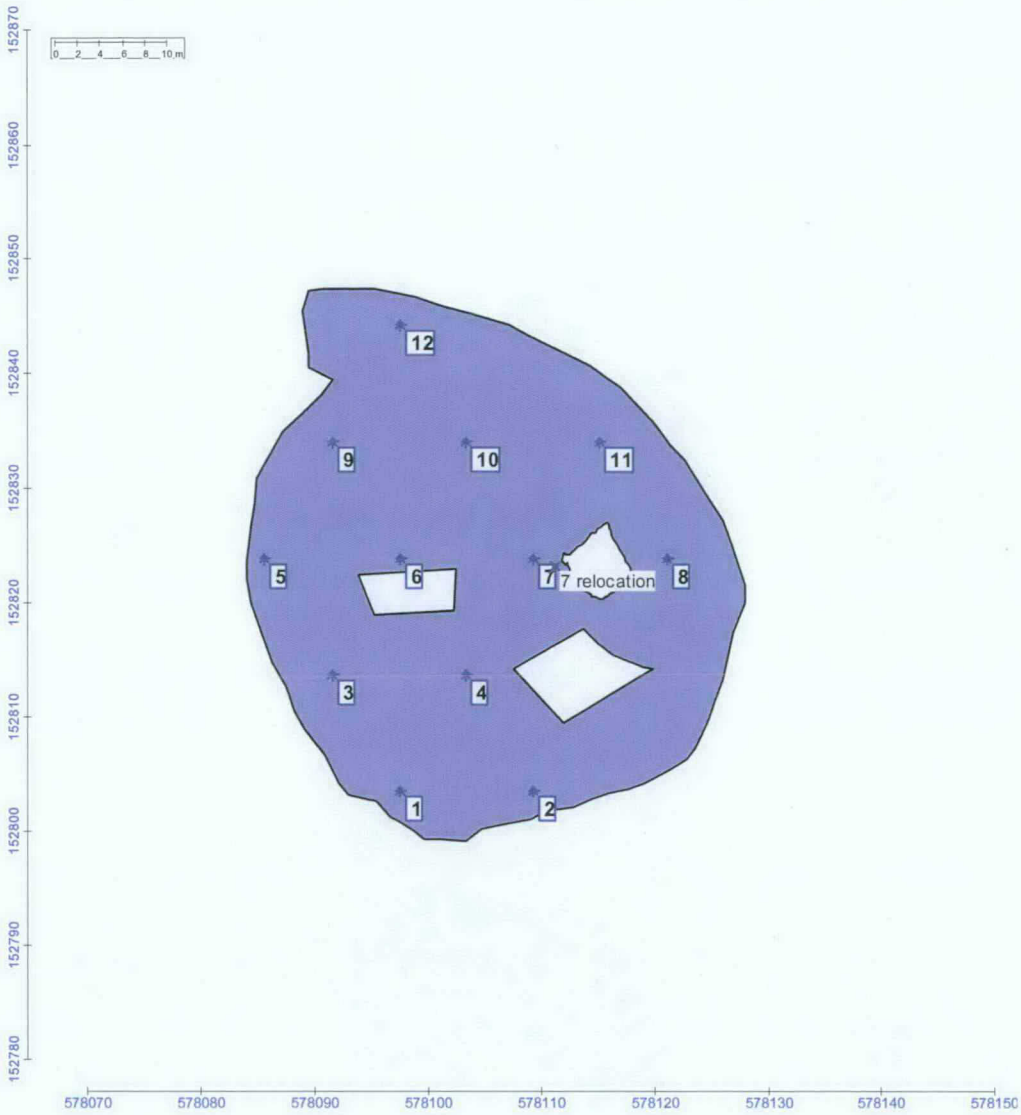


Figure 16. 116-H-5 Overburden Soil Stockpile Sample Locations.

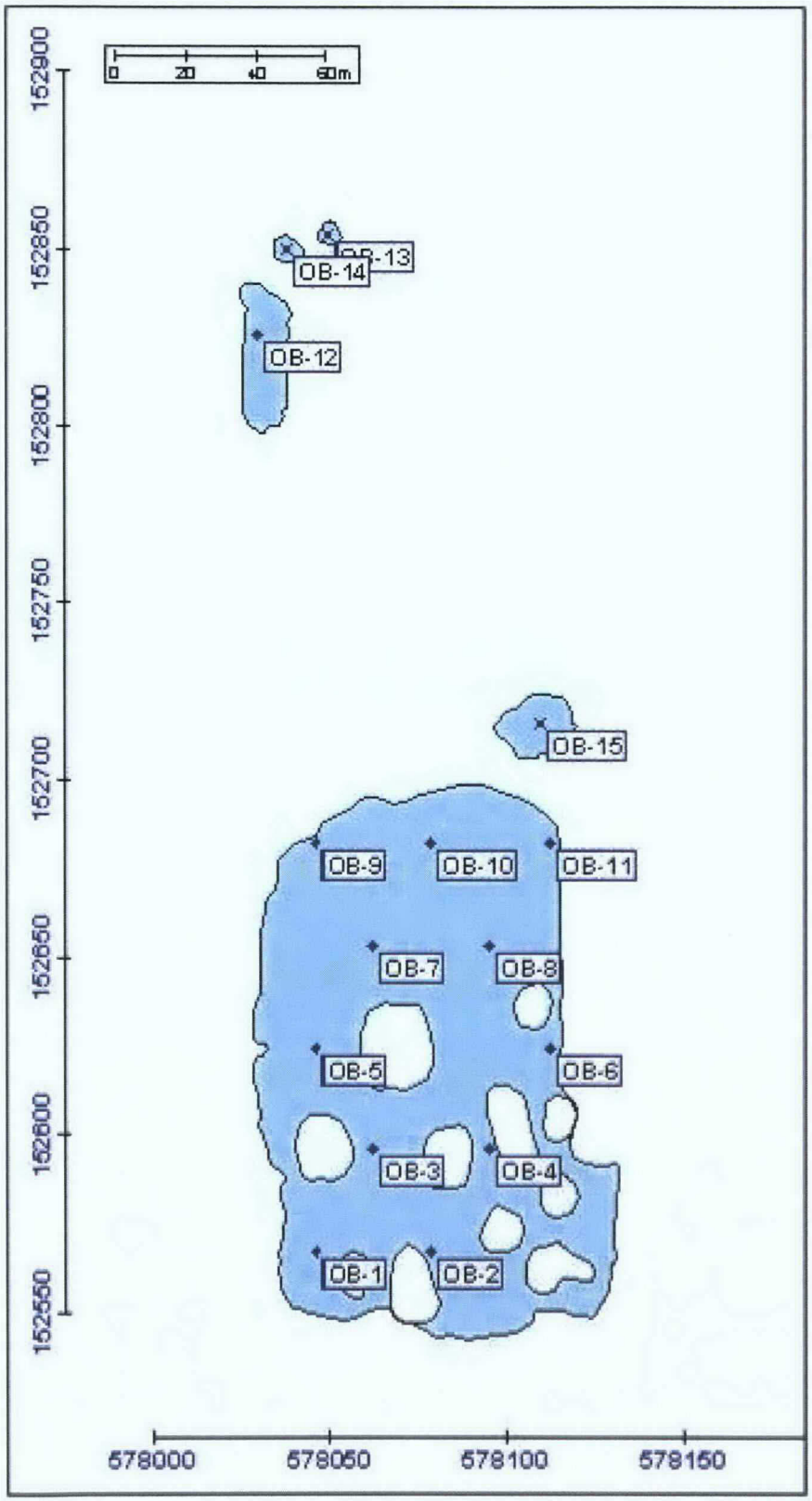
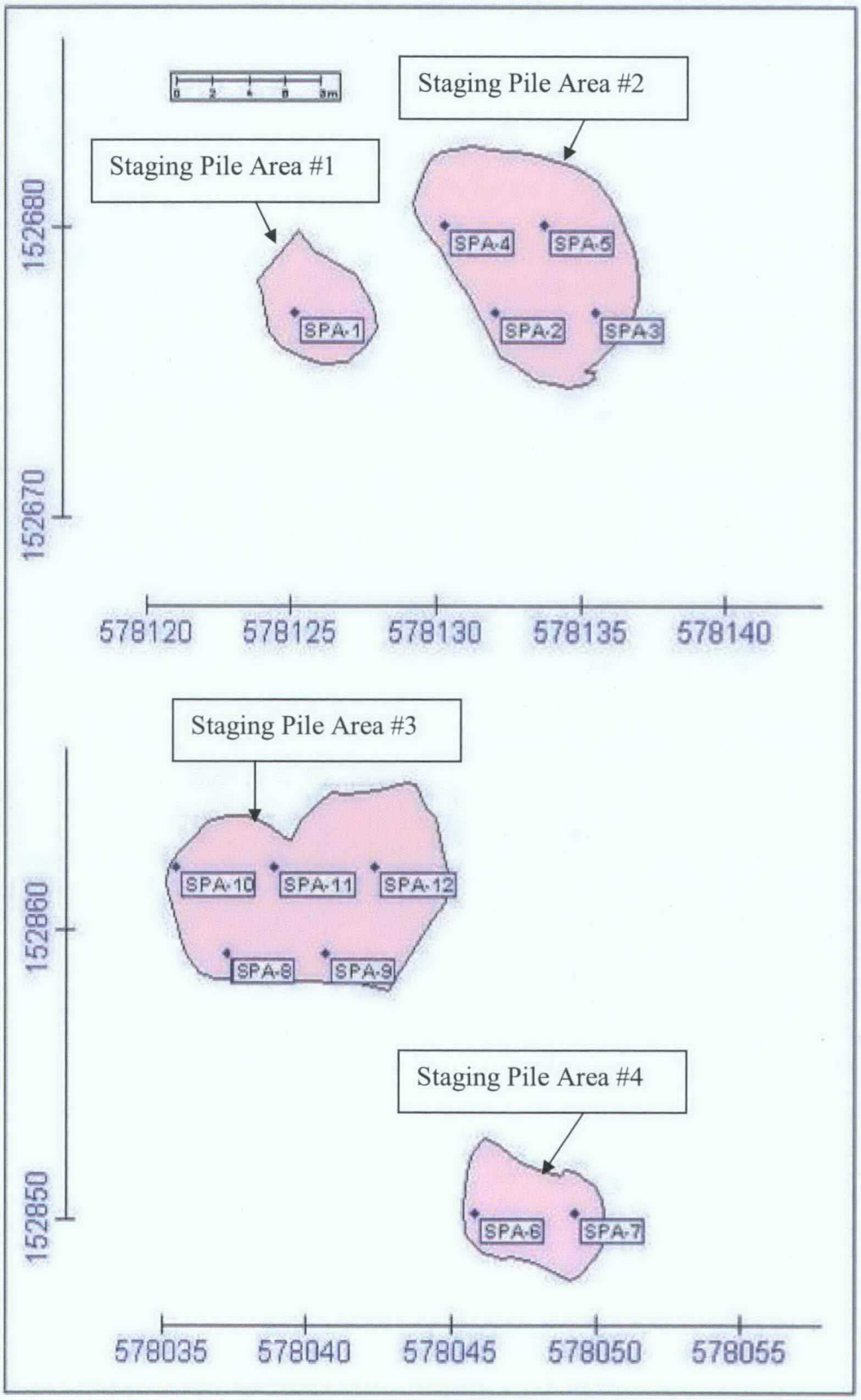


Figure 17. 116-H-5 Waste Staging Pile Area Sample Locations.



One discrete soil sample was collected at each verification sample location of surficial soils (0 to 0.15 m [0 to 6 in.] below ground surface). Each sample was analyzed for the constituent groups listed in Table 1. All samples were requested for full protocol laboratory analysis.

After the initial verification samples were analyzed, it was determined that some sample locations in each decision unit exceeded the site cleanup criteria. The entire deep zone exceeded cleanup criteria except for sample location 2, along with sample locations 9 and 11 in the shallow zone, and sample location 8 in the overburden. Therefore, those locations that exceeded RAGs, as well as sample location 2 in the deep zone, were remediated and re-sampled using the original sample design (WCH 2011a). Location 7 within the deep zone was sampled at the new location as depicted in Table 1, as the original sample design coordinates placed this sample under water. The waste staging area footprint exceeded RAGs within areas 1, 3, and 4, but not area 2. Thus, after remediation of areas 1, 3, and 4, a new sample design was completed that excluded area 2 from re-sampling. Figure 18 includes area 1, while Figure 19 includes areas 3 and 4. Sample results for the original, failed deep zone and staging pile area verification samples are included in Appendix B.

Table 1. 116-H-5, 1904-H Outfall Structure Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number	WSP Coordinates		Sample Analysis
		Northing	Easting	
SZ-1	J19YB8	152780.1	578092.5	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, TPH, IC anions [b], nitrates/nitrites [c], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
SZ-2	J19YB9	152780.1	578110.8	
SZ-3	J19YC0	152780.1	578129.2	
SZ-4	J19YC1	152796.0	578083.3	
SZ-5	J19YC2	152796.0	578101.7	
SZ-6	J19YC3	152796.0	578120.0	
SZ-7	J19YC4	152811.9	578074.2	
SZ-8	J19YC5	152811.9	578129.2	
SZ-9	J19YC6	152827.7	578065.0	
SZ-10	J19YC7	152827.7	578083.3	
SZ-11	J19YC8	152843.6	578074.2	
SZ-12	J19YC9	152843.6	578110.8	
Duplicate [d]	J19YD0	152780.1	578110.8	
DZ-1	J19YD1	152803.4	578097.5	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, TPH, IC anions [b], nitrates/nitrites [c], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
DZ-2	J19YD2	152803.4	578109.3	
DZ-3	J19YD3	152813.7	578091.6	
DZ-4	J19YD4	152813.7	578103.4	
DZ-5	J19YD5	152823.9	578085.7	
DZ-6	J19YD6	152823.9	578097.5	
DZ-7 (under water)	J19YD7	152823.9	578109.3	
DZ-7 (new location)	J19YD7	152823.2	578111.2	
DZ-8	J19YD8	152823.9	578121.1	
DZ-9	J19YD9	152834.1	578091.6	
DZ-10	J19YF0	152834.1	578103.4	
DZ-11	J19YF1	152834.1	578115.2	
DZ-12	J19YF2	152844.3	578097.5	
Duplicate [d]	J19YF3	152803.4	578097.5	

Table 1. 116-H-5, 1904-H Outfall Structure Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number	WSP Coordinates		Sample Analysis
		Northing	Easting	
OB-1	J19YF4	152567.1	578045.8	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, TPH, IC anions [b], nitrates/nitrites [c], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
OB-2	J19YF5	152567.1	578079.1	
OB-3	J19YF6	152595.9	578062.5	
OB-4	J19YF7	152595.9	578095.7	
OB-5	J19YF8	152624.7	578045.8	
OB-6	J19YF9	152624.7	578112.3	
OB-7	J19YH0	152653.4	578062.5	
OB-8	J19YH1	152653.4	578095.7	
OB-9	J19YH2	152682.2	578045.8	
OB-10	J19YH3	152682.2	578079.1	
OB-11	J19YH4	152682.2	578112.3	
OB-12	J19YH5	152826.1	578029.2	
OB-13	J1B4H9	152854.3	578050.2	
OB-14	J1B4J0	152849.5	578037.5	
OB-15	J1B4J1	152716.0	578109.7	
Duplicate [d]	J19YH6	152624.7	578045.8	
SPA-1	J19YH7	152677.1	578125.1	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, TPH, IC anions [b], nitrates/nitrites [c], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
SPA-2	J19YH8	152677.1	578132.0	
SPA-3	J19YH9	152677.1	578135.4	
SPA-4	J19YJ0	152680.1	578130.3	
SPA-5	J19YJ1	152680.1	578133.7	
SPA-6	J19YJ2	152850.2	578045.8	
SPA-7	J19YJ3	152850.2	578049.3	
SPA-8	J19YJ4	152859.2	578037.2	
SPA-9	J19YJ5	152859.2	578040.7	
SPA-10	J19YJ6	152862.2	578035.5	
SPA-11	J19YJ7	152862.2	578038.9	
SPA-12	J19YJ8	152862.2	578042.4	
Duplicate [d]	J19YJ9	152859.2	578037.2	
Equipment blank	J19YK0	NA	NA	ICP metals [a], mercury, SVOA

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

[b] The expanded list of IC anions will include bromide, fluoride, and phosphate in the analytical results package.

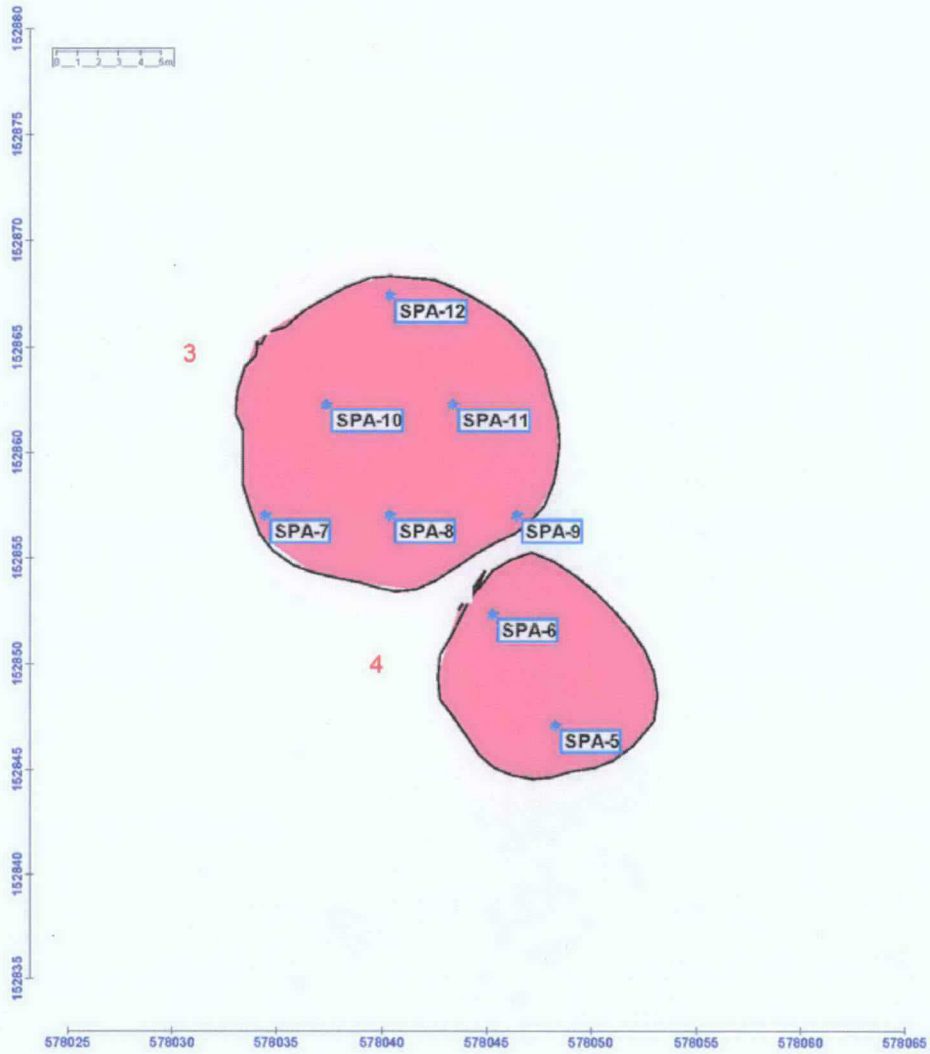
[c] To preclude holding time issues associated with EPA Method 300.0 for nitrites and nitrates, EPA Method 353 will be performed.

[d] One duplicate soil sample will be collected from each decision unit at a location selected at the project analytical lead's discretion.

EPA = U.S. Environmental Protection Agency
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
TPH = total petroleum hydrocarbons
WSP = Washington State Plane

Figure 18. 116-H-5 Waste Staging Pile Area Sample Locations Following Remediation for Area 1.

Figure 19. 116-H-5 Waste Staging Pile Area Sample Locations Following Remediation for Areas 3 and 4.



After the second verification samples were analyzed, it was determined that some sample locations in the deep zone and staging pile area decision unit exceeded the groundwater and river protection site cleanup criteria. Sample locations 1 through 5, 7, and 8 in the deep zone exceeded cleanup criteria, along with sample location 12 in the staging pile area. Additional material was removed locations 1 through 4, 7, and 8 from these deep-zone locations and replacement samples were collected using the original sample design and the list of COPCs from the second sampling campaign (WCH 2011b). Location 7 within the deep zone was sampled at the new location as depicted in Table 1, as the original design coordinates placed this sample under water. Sample 5 was not remediated additionally because of the close proximity of the sample location to the 100-H-42 pipeline and the difficult task of further excavation in this area. Sample 12 in the staging pile area was also not remediated additionally because the sample results at this location passed a site-specific RESRAD calculation that shows residual soil concentrations are protective of groundwater and the river (Appendix C).

A summary of the verification samples collected and laboratory analyses performed following the second remediation campaign is provided in Table 2. Table 3 includes a summary of the verification samples collected and laboratory analyses performed for the additional samples taken following the third remediation campaign. All sampling was performed in accordance with ENV-1, *Environmental Monitoring & Management*, to fulfill the requirements of the SAP (DOE-RL 2009a). Additional information related to verification sampling can be found in the field sampling logbooks (WCH 2011a, 2011b).

Table 2. 116-H-5, First Re-Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number	WSP Coordinates		Sample Analysis
		Northing	Easting	
Deep Zone				
DZ-1	J1FKK1	152803.4	578097.5	ICP metals [a], mercury, SVOA, PAH
DZ-2	J1FKK2	152803.4	578109.3	
DZ-3	J1FKK3	152813.7	578091.6	
DZ-4	J1FKK4	152813.7	578103.4	
DZ-5	J1FKK5	152823.9	578085.7	
DZ-6	J1FKK6	152823.9	578097.5	
DZ-7	J1FKK7	152823.2	578111.2	
DZ-8	J1FKK8	152823.9	578121.1	
DZ-9	J1FKK9	152834.1	578091.6	
DZ-10	J1FKL0	152834.1	578103.4	
DZ-11	J1FKL1	152834.1	578115.2	
DZ-12	J1FKL2	152844.3	578097.5	
Duplicate [b]	J1FKL3	152823.9	578121.1	
Shallow Zone				
SZ-9	J1FKL4	152827.7	578065.0	ICP metals [a], mercury, Cr^{+6}, PCBs, SVOA, TPH, IC anions [c], nitrates/nitrites [d], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
SZ-11	J1FKL5	152843.6	578074.2	
Overburden				
OB-8	J1FKL6	152653.4	578095.7	ICP metals [a], mercury, Cr^{+6}, PCBs, SVOA, TPH, IC anions [c], nitrates/nitrites [d], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
Staging Pile Area				
SPA-1	J1FKL7	152674.6	578124.6	ICP metals [a], mercury, Cr^{+6}, PCBs, SVOA, TPH, IC anions [c], nitrates/nitrites [d], PAH, pesticides, GEA, carbon-14, nickel-63, tritium, strontium-90, technetium-99, isotopic uranium, isotopic plutonium
SPA-2	J1FKL8	152674.6	578130.6	
SPA-3	J1FKL9	152679.9	578127.6	
SPA-4	J1FKM0	152685.1	578124.6	
SPA-5	J1FKM1	152847.2	578048.3	
SPA-6	J1FKM2	152852.4	578045.3	
SPA-7	J1FKM3	152857.1	578034.4	
SPA-8	J1FKM4	152857.1	578040.4	
SPA-9	J1FKM5	152857.1	578046.5	
SPA-10	J1FKM6	152862.3	578037.4	
SPA-11	J1FKM7	152862.3	578043.4	
SPA-12	J1FKM8	152867.5	578040.4	
Duplicate [b]	J1FKM9	152685.1	578124.6	

Table 2. 116-H-5, First Re-Sample Summary. (2 Pages)

Sample Location	HEIS Sample Number	WSP Coordinates		Sample Analysis
		Northing	Easting	
Equipment blank	J1FKN0	NA	NA	ICP metals [a], mercury, SVOA

[a] The expanded list of ICP metals will include antimony, arsenic, barium, beryllium, boron, cadmium, chromium(total), cobalt, copper, lead, manganese, magnesium, molybdenum, nickel, selenium, silver, vanadium, and zinc in the analytical results package.
[b] One duplicate soil sample will be collected from each decision unit at a location selected at the project analytical lead's discretion.
[c] The expanded list of IC anions will include bromide, fluoride, and phosphate in the analytical results package.
[d] To preclude holding time issues associated with EPA Method 300.0 for nitrites and nitrates, EPA Method 353 will be performed.

EPA = U.S. Environmental Protection Agency
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
TPH = total petroleum hydrocarbons
WSP = Washington State Plane

Table 3. 116-H-5, Second Re-Sample Summary.

Sample Location	HEIS Sample Number	WSP Coordinates		Sample Analysis
		Northing	Easting	
Deep Zone				
DZ-1	J1HH80	152803.4	578097.5	ICP metals [a], mercury, SVOA, PAH
DZ-2	J1HH81	152803.4	578109.3	
DZ-3	J1HH82	152813.7	578091.6	
DZ-4	J1HH83	152813.7	578103.4	
DZ-7	J1HH84	152823.2	578111.2	
DZ-8	J1HH85	152823.9	578121.1	
Duplicate [b]	J1HH86	152823.9	578121.1	
Equipment blank	J1FKN0	NA	NA	ICP metals [a], mercury, SVOA

[a] The expanded list of ICP metals will include antimony, arsenic, barium, beryllium, boron, cadmium, chromium(total), cobalt, copper, lead, manganese, magnesium, molybdenum, nickel, selenium, silver, vanadium, and zinc in the analytical results package.
[b] One duplicate soil sample will be collected from each decision unit at a location selected at the project analytical lead's discretion.

HEIS = Hanford Environmental Information System
ICP = inductively coupled plasma
NA = not applicable
PAH = polycyclic aromatic hydrocarbons
SVOA = semivolatile organic analysis
WSP = Washington State Plane

Verification Sample Results

Verification samples were analyzed using U.S. Environmental Protection Agency-approved analytical methods (DOE-RL 2009b). Evaluation of the verification data from the excavation was performed by direct comparison of the statistical or maximum sample results for each COPC against cleanup criteria.

Comparisons of the results for each COPC from the 116-H-5 shallow-zone and deep-zone excavations against site RAGs are summarized in Tables 4 and 5, respectively. Comparisons of the results for each COPC from the 116-H-5 overburden pile and waste staging pile area footprint against site RAGs are summarized in Tables 6 and 7, respectively. Contaminants that were not detected by laboratory analysis are excluded from these tables. Potassium-40, radium-226, radium-228, thorium-228, and thorium-232 were detected in samples collected at the decision units, but are not included in the comparison tables, as these isotopes are unrelated to the operational history of the site and were 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 provided in *Hanford Site Background: Part 2, Soil Background for Radionuclides* [DOE-RL 1996]). Calculated cleanup levels are not presented in the Cleanup Levels and Risk Calculations Database (Ecology 2009) 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 also not included in these tables. The complete laboratory results are stored in the ENvironmental REstoration (ENRE) project-specific database prior to archival in the Hanford Environmental Information System (HEIS), and are presented in the 95% UCL calculations (Appendix D).

DATA EVALUATION

Evaluation of the results listed in Tables 4, 5, 6, and 7 from the verification sampling at the 116-H-5 waste site indicate that no contaminants exceed direct exposure RAGs. Residual contaminant concentrations within the deep zone decision unit were evaluated separately from those within the shallow zone, overburden soil piles, and waste staging area decision units because the deep zone excavation extended into the groundwater table and site specific modeling was necessary to demonstrate protection of groundwater and the Columbia River.

Shallow Zone/Overburden/Staging Pile Data Evaluation

Groundwater and/or the Columbia River protection soil RAGs are exceeded in the shallow zone, overburden, and staging pile areas for lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, 4,4'-DDE, 4,4'-DDT, and total PCBs.

Table 4. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Shallow-Zone Excavation Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (pCi/g)	Site Lookup Values [a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Value for Groundwater Protection	Soil Value for River Protection		
Carbon-14	0.8	8.69	-- [c]	-- [c]	No	--
Nickel-63	3.72	4,013	83	166	No	--
Total beta radiostrontium	0.357	4.5	27.6	55.2	No	--
Tritium [d]	2.08	459	12.6	25.2	No	--
Uranium-233/234	0.0 (<BG)	1.1 [e]	1.1 [e]	1.1 [e]	No	--
Uranium-238	0.0 (<BG)	1.1 [e]	1.1 [e]	1.1 [e]	No	--
COC/COPC	**Statistical Result [b] (mg/kg)**	**Remedial Action Goals [a] (mg/kg)**			**Does the Statistical Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Arsenic	6.53	20 [e]	20 [e]	20 [e]	No	--
Barium	62.4 (<BG)	5,600	200	400	No	--
Beryllium	0.198 (<BG)	10.4 [f]	1.51 [e]	1.51 [e]	No	--
Boron [g]	1.59	7,200	320	-- [h]	No	--
Cadmium [i]	0.0853 (<BG)	13.9 [f]	0.81 [e]	0.81 [e]	No	--
Chromium	12.9 (<BG)	80,000	18.5 [e]	18.5 [e]	No	--
Cobalt	6.30 (<BG)	24	15.7 [e]	-- [h]	No	--
Copper	14.4 (<BG)	2,960	59.2	22.0 [e]	No	--
Hexavalent chromium [g]	0.060	2.1 [f]	4.8	2	No	--
Lead	18.8	353	10.2 [e]	10.2 [e]	Yes	Yes [j]
Manganese	269 (<BG)	3,760	512 [e]	512 [e]	No	--
Mercury	0.019 (<BG)	24	0.33 [e]	0.33 [e]	No	--
Molybdenum [g]	0.273	400	8	-- [h]	No	--
Nickel	11.5 (<BG)	1,600	19.1 [e]	27.4	No	--
Vanadium	48.2 (<BG)	560	85.1 [e]	-- [h]	No	--
Zinc	47.2 (<BG)	24,000	480	67.8 [e]	No	--
Chloride	2.1 (<BG)	--	25,000	--	No	--
Fluoride	0.98 (<BG)	4,800	96	400	No	--
Nitrogen in nitrate	2.44 (<BG)	128,000	1,000	2,000	No	--
Nitrogen in nitrate and nitrite	1.9 (<BG)	128,000	1,000	2,000	No	--
Sulfate	9.2 (<BG)	--	25,000	--	No	--
Acenaphthene	0.00279	4,800	96	129	No	--
Anthracene	0.0076	24,000	240	1,920	No	--
Benzo(a)anthracene	0.0208	1.37	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(a)pyrene	0.0188	0.137	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(b)fluoranthene	0.014	1.37	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(k)fluoranthene	0.00675	1.37	0.015 [k]	0.015 [k]	No	--
Benzo(ghi)perylene [l]	0.0117	2,400	48	192	No	--
Chrysene	0.0236	13.7	0.12	0.1 [k]	No	--

Table 4. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Shallow-Zone Excavation Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (mg/kg)	Remedial Action Goals [a] (mg/kg)			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Dibenz(a,h)anthracene	0.00275	1.37	0.03 [k]	0.03 [k]	No	--
Fluoranthene	0.0666	3,200	64	18.0	No	--
Fluorene	0.00157	3,200	64	260	No	--
Indeno(1,2,3-cd)pyrene	0.0136	1.37	0.33 [k]	0.33 [k]	No	--
Naphthalene	0.015	1,600	16.0	988	No	--
Phenanthrene [l]	0.0217	24,000	240	1,920	No	--
Pyrene	0.0254	2,400	48	192	No	--
Aroclor-1260	0.00385	0.5	0.017 [k]	0.017 [k]	No	--
4,4'-DDE	0.00045	2.94	0.0257	0.0033 [k]	No	--
TPH-diesel range	2.6	200	200	200	No	--
TPH-diesel range EXT	8.1	200	200	200	No	--
TPH-motor oil (high boiling)	13.352	200	200	200	No	--

[a] Lookup values and RAGs obtained from the 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] 95% upper confidence limit or maximum value, depending on data censorship, as described in Appendix D.

[c] No value; because the distribution coefficient value for this contaminant is greater than 80 mL/g, RESRAD modeling discussed in Appendix C of the 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] Tritium samples were taken 15.2 cm (6 in.) below the excavation surface. Where tritium was detected, results were discussed with the lead regulatory agency for appropriate cleanup verification sampling (per TPA-CN-177).

[e] Where cleanup levels are less than background, cleanup levels default to background (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 2.12.1 of the RDR/RAWP (DOE-RL 2009b).

[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] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).

[i] Hanford Site-specific background not available. Value is Washington State background from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).

[j] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of lead, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene are not predicted to migrate more than 1.8 m (6.0 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for lead. The distance to groundwater from the bottom of the shallow-zone excavation is 7.0 m (23.0 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

[k] 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.

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

-- = not available
AWQC = ambient water quality criteria
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
EPA = U.S. Environmental Protection Agency
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)
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 5. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Deep-Zone Excavation Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (pCi/g)	Site Lookup Values [a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Value for Groundwater Protection	Soil Value for River Protection		
Carbon-14	0.898	8.69	-- [c]	-- [c]	No	--
Cesium-137	0.161 (<BG)	6.2	1,465	2,930	No	--
Cobalt-60	0.045	1.4	13,900	27,800	No	--
Europium-152	1.37	3.3	-- [c]	-- [c]	No	--
Nickel-63	3.11	4,013	83	166	No	--
Tritium [d]	2.49	459	12.6	25.2	No	--
Uranium-233/234	0.0 (<BG)	1.1 [e]	1.1 [e]	1.1 [e]	No	--
Uranium-238	0.0 (<BG)	1.1 [e]	1.1 [e]	1.1 [e]	No	--
COC/COPC	**Statistical Result [b] (mg/kg)**	**Remedial Action Goals [a] (mg/kg)**			**Does the Statistical Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Arsenic	6.3 (<BG)	20 [e]	20 [e]	20 [e]	No	--
Barium	69.8 (<BG)	5,600	200	400	No	--
Beryllium	0.089 (<BG)	10.4 [f]	1.51 [e]	1.51 [e]	No	--
Boron [g]	1.2	7,200	320	-- [h]	No	--
Cadmium [i]	0.089 (<BG)	13.9 [f]	0.81 [e]	0.81 [e]	No	--
Chromium	11.6 (<BG)	80,000	18.5 [e]	18.5 [e]	No	--
Cobalt	6.2 (<BG)	24	15.7 [e]	-- [h]	No	--
Copper	15.3 (<BG)	2,960	59.2	22.0 [e]	No	--
Lead	18.7	353	10.2 [e]	10.2 [e]	Yes	N/A [j]
Manganese	255 (<BG)	3,760	512 [e]	512 [e]	No	--
Mercury	0.020 (<BG)	24	0.33 [e]	0.33 [e]	No	--
Molybdenum [g]	0.87	400	8	-- [h]	No	--
Nickel	11.7 (<BG)	1,600	19.1 [e]	27.4	No	--
Vanadium	47.0 (<BG)	560	85.1 [e]	-- [h]	No	--
Zinc	43.6 (<BG)	24,000	480	67.8 [e]	No	--
Chloride	17.6 (<BG)	--	25,000	--	No	--
Fluoride	1.3 (<BG)	4,800	96	400	No	--
Nitrogen in nitrate	34	128,000	1,000	2,000	No	--
Nitrogen in nitrate and nitrite	31.3	128,000	1,000	2,000	No	--
Nitrogen in nitrite [g,]	0.4	8,000	100	200	No	--
Sulfate	55.2 (<BG)	--	25,000	--	No	--
Anthracene	0.0051	24,000	240	1,920	No	--
Benzo(a)anthracene	0.054	1.37	0.015 [k]	0.015 [k]	Yes	N/A [l,]
Benzo(a)pyrene	0.041	0.137	0.015 [k]	0.015 [k]	Yes	N/A [l,]
Benzo(b)fluoranthene	0.051	1.37	0.015 [k]	0.015 [k]	Yes	N/A [l,]
Benzo(k)fluoranthene	0.030	1.37	0.015 [k]	0.015 [k]	Yes	N/A [l,]
Benzo(ghi)perylene [n]	0.032	2,400	48	192	No	--
Bis(2-ethylhexyl)phthalate	0.067	71.4	0.6	0.36	No	--

Table 5. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Deep-Zone Excavation Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (mg/kg)	Remedial Action Goals [a] (mg/kg)			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Chrysene	0.045	13.7	0.12	0.1 [k]	No	--
Fluoranthene	0.069	3,200	64	18.0	No	--
Indeno(1,2,3-cd)pyrene	0.035	1.37	0.33 [k]	0.33 [k]	No	--
Phenanthrene [m]	0.018	24,000	240	1,920	No	--
Pyrene	0.077	2,400	48	192	No	--
Aroclor-1260	0.00731	0.5	0.017 [k]	0.017 [k]	No	--
4,4'-DDD	0.00212	4.17	0.0365	0.0033 [k]	No	--
4,4'-DDT	0.00310	2.94	0.0257	0.0033 [k]	No	--
TPH-motor oil (high boiling)	33.76	200	200	200	No	--

[a] Lookup values and RAGs obtained from the 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] 95% upper confidence limit or maximum value, depending on data censorship, as described in Appendix D.

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

[d] Tritium samples were taken 15.2 cm (6 in.) below the excavation surface. Where tritium was detected, results were discussed with the lead regulatory agency for appropriate cleanup verification sampling (per TPA-CN-177).

[e] 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 RDR/RAWP (DOE-RL 2009).

[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/m3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

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

[h] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).

[i] Hanford Site-specific background not available. Value is Washington State background from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).

[j] The 95% UCL value for lead (18.7 mg/kg) in the deep zone decision unit is within the range of Hanford and Washington statewide background concentrations. Additionally, residual concentrations of lead at the 116-H-5 waste site are consistent with concentrations detected in the riparian zone reference areas as indicated in the *River Corridor Baseline Risk Assessment Report Volume II, Draft C* (DOE-RL 2010).

[k] 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.

[l] The K_d values for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are extremely high (the lowest K_d value being 360 mL/g for benzo(a)anthracene) and would not be expected to partition from the soil column into the groundwater. These contaminants also have not been detected in downstream sediment samples collected for the River Corridor Baseline Risk Assessment.

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

-- = not available
AWQC = ambient water quality criteria
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
DDD = dichlorodiphenyldichloroethane
DDT = dichlorodiphenyltrichloroethane
EPA = U.S. Environmental Protection Agency
N/A = not applicable
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)
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 6. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Overburden Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (pCi/g)	Site Lookup Values [a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Value for Groundwater Protection	Soil Value for River Protection		
Carbon-14	0.866	8.69	-- [c]	-- [c]	No	--
Plutonium-238	0.264	38.8	-- [c]	-- [c]	No	--
Tritium [d]	0.57	459	12.6	25.2	No	--
Uranium-233/234	0.06	1.1 [e]	1.1 [e]	1.1 [e]	No	--
Uranium-238	0.0 (<BG)	1.1 [e]	1.1 [e]	1.1 [e]	No	--
COC/COPC	**Statistical Result [b] (mg/kg)**	**Remedial Action Goals [a] (mg/kg)**			**Does the Statistical Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Antimony [f]	0.414 (<BG)	32	5 [e]	5 [e]	No	--
Arsenic	5.89 (<BG)	20 [e]	20 [e]	20 [e]	No	--
Barium	53.8 (<BG)	5,600	200	400	No	--
Beryllium	0.174 (<BG)	10.4 [g]	1.51 [e]	1.51 [e]	No	--
Boron [h]	1.43	7,200	320	-- [i]	No	--
Cadmium [f]	0.094 (<BG)	13.9 [g]	0.81 [e]	0.81 [e]	No	--
Chromium	11.5 (<BG)	80,000	18.5 [e]	18.5 [e]	No	--
Cobalt	5.58 (<BG)	24	15.7 [e]	-- [i]	No	--
Copper	13.6 (<BG)	2,960	59.2	22.0 [e]	No	--
Hexavalent chromium [h]	0.16	2.1 [g]	4.8	2	No	--
Lead	17.0	353	10.2 [e]	10.2 [e]	Yes	Yes [j]
Manganese	258 (<BG)	3,760	512 [e]	512 [e]	No	--
Molybdenum [h]	0.318	400	8	-- [i]	No	--
Nickel	10.8 (<BG)	1,600	19.1 [e]	27.4	No	--
Silver	0.156 (<BG)	400	8	0.73 [e]	No	--
Vanadium	44.4 (<BG)	560	85.1 [e]	-- [i]	No	--
Zinc	43.4 (<BG)	24,000	480	67.8 [e]	No	--
Chloride	20.6 (<BG)	--	25,000	--	No	--
Fluoride	0.8 (<BG)	4,800	96	400	No	--
Nitrogen in nitrate	3.0 (<BG)	128,000	1,000	2,000	No	--
Nitrogen in nitrate and nitrite	2.4 (<BG)	128,000	1,000	2,000	No	--
Sulfate	8.2 (<BG)	--	25,000	--	No	--
Acenaphthene	0.0219	4,800	96	129	No	--
Anthracene	0.0584	24,000	240	1,920	No	--
Benzo(a)anthracene	0.0785	1.37	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(a)pyrene	0.0831	0.137	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(b)fluoranthene	0.105	1.37	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(k)fluoranthene	0.0219	1.37	0.015 [k]	0.015 [k]	Yes	Yes [j]
Benzo(ghi)perylene [l]	0.0629	24,000	48	192	No	--
Bis(2-ethylhexyl)phthalate	0.120	71.4	0.6	0.36	No	--
Chrysene	0.113	13.7	0.12	0.1 [k]	Yes	Yes [j]
Dibenz(a,h)anthracene	0.00629	1.37	0.03 [k]	0.03 [k]	No	--

Table 6. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Overburden Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (mg/kg)	Remedial Action Goals [a] (mg/kg)			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Fluoranthene	0.188	3,200	64	18.0	No	--
Fluorene	0.0323	3,200	64	260	No	--
Indeno(1,2,3-cd)pyrene	0.0834	1.37	0.33 [k]	0.33 [k]	No	--
Naphthalene	0.0251	1,600	16.0	988	No	--
Phenanthrene [l]	0.107	24,000	240	1,920	No	--
Pyrene	0.342	2,400	48	192	No	--
4,4'-DDE	0.00045	2.94	0.0257	0.0033 [k]	No	--
TPH-diesel range	3.2	200	200	200	No	--
TPH-diesel range EXT	6.5	200	200	200	No	--
TPH-motor oil (high boiling)	15.0	200	200	200	No	--

[a] Lookup values and RAGs obtained from the 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] 95% upper confidence limit or maximum value, depending on data censorship, as described in Appendix D.

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

[d] Tritium samples were taken 15.2 cm (6 in.) below the excavation surface. Where tritium was detected, results were discussed with the lead regulatory agency for appropriate cleanup verification sampling (per TPA-CN-177).

[e] 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 RDR/RAWP (DOE-RL 2009).

[f] Hanford Site-specific background not available. Value is Washington State background from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).

[g] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m3 (*Hanford Guidance for Radiological Cleanup* [WDOH 1997]).

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

[i] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).

[j] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are not predicted to migrate more than 1.8 m (6.0 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for lead. The distance to groundwater from the future placement of the overburden within the excavation will be at least 2.0 m (6.6 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

[k] 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.

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

-- = not available
AWQC = ambient water quality criteria
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
EPA = U.S. Environmental Protection Agency
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)
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

Table 7. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Staging Pile Area Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (pCi/g)	Site Lookup Values [a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Value for Groundwater Protection	Soil Value for River Protection		
Cesium-137	0.0245 (<BG)	6.2	1,465	2,930	No	--
Technitium-99	0.499	5.8	0.46	0.92	Yes	Yes [c]
Uranium-233/234	0.0 (<BG)	1.1 [d]	1.1 [d]	1.1 [d]	No	--
Uranium-238	0.0	1.1 [d]	1.1 [d]	1.1 [d]	No	--
COC/COPC	**Statistical Result [b] (mg/kg)**	**Remedial Action Goals [a] (mg/kg)**			**Does the Statistical Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Arsenic	14.0	20 [d]	20 [d]	20 [d]	No	--
Barium	80.0 (<BG)	5,600	200	400	No	--
Beryllium	0.17 (<BG)	10.4 [e]	1.51 [d]	1.51 [d]	No	--
Boron [f]	2.4	7,200	320	-- [g]	No	--
Cadmium [h]	0.12 (<BG)	13.9 [e]	0.81 [d]	0.81 [d]	No	--
Chromium	11.0 (<BG)	80,000	18.5 [d]	18.5 [d]	No	--
Cobalt	6.9 (<BG)	24	15.7 [d]	-- [g]	No	--
Copper	14.8 (<BG)	2,960	59.2	22.0 [d]	No	--
Lead	33.4	353	10.2 [d]	10.2 [d]	Yes	Yes [i]
Manganese	283 (<BG)	3,760	512 [d]	512 [d]	No	--
Mercury	0.014 (<BG)	24	0.33 [d]	0.33 [d]	No	--
Molybdenum [f]	0.33	400	8	-- [g]	No	--
Nickel	10.8 (<BG)	1,600	19.1 [d]	27.4	No	--
Vanadium	48.0 (<BG)	560	85.1 [d]	-- [g]	No	--
Zinc	41.1 (<BG)	24,000	480	67.8 [d]	No	--
Chloride	9.5 (<BG)	--	25,000	--	No	--
Fluoride	1.0 (<BG)	4,800	96	400	No	--
Nitrogen in nitrate	15.3	128,000	1,000	2,000	No	--
Nitrogen in nitrate and nitrite	16.0	128,000	1,000	2,000	No	--
Sulfate	51.6 (<BG)	--	25,000	--	No	--
Acenaphthylene [j]	0.027	4,800	96	129	No	--
Anthracene	0.087	24,000	240	1,920	No	--
Benzo(a)anthracene	0.058	1.37	0.015 [k]	0.015 [k]	Yes	Yes [i]
Benzo(a)pyrene	0.0885	0.137	0.015 [k]	0.015 [k]	Yes	Yes [i]
Benzo(b)fluoranthene	0.048	1.37	0.015 [k]	0.015 [k]	Yes	Yes [i]
Benzo(k)fluoranthene	0.023	1.37	0.015 [k]	0.015 [k]	Yes	Yes [i]
Benzo(ghi)perylene [j]	0.096	24,00	48	192	No	--
Bis(2ethylhexyl)phthalate	0.121	71.4	0.6	0.36	No	--
Chrysene	0.047	13.7	0.12	0.1 [k]	No	--
Dibenz(a,h)anthracene	0.026	1.37	0.03 [k]	0.03 [k]	No	--
Fluoranthene	0.4	3,200	64	18.0	No	--
Fluorene	0.057	3,200	64	260	No	--

Table 7. Comparison of Statistical Contaminant Concentrations to Action Levels for the 116-H-5 Staging Pile Area Verification Samples. (2 Pages)

COC/COPC	Statistical Result [b] (mg/kg)	Remedial Action Goals [a] (mg/kg)			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Indeno(1,2,3-cd)pyrene	0.036	1.37	0.33 [k]	0.33 [k]	No	--
Phenanthrene [j]	0.05	24,000	240	1,920	No	--
Pyrene	0.105	2,400	48	192	No	--
Aroclor-1254	0.015	0.5	0.017 [k]	0.017 [k]	No	--
Aroclor-1260	0.010	0.5	0.017 [k]	0.017 [k]	No	--
Total PCBs	0.025	0.5	0.017 [k]	0.017 [k]	No	Yes [i]
4,4'-DDE	0.040	2.94	0.0257	0.0033 [k]	Yes	Yes [i]
4,4'-DDT	0.0053	2.94	0.0257	0.0033 [k]	Yes	Yes [i]
TPH-diesel range	6.149	200	200	200	No	--
TPH-diesel range EXT	19.353	200	200	200	No	--
TPH-motor oil (high boiling)	147.061	200	200	200	No	--

[a] Lookup values and RAGs obtained from the 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] 95% upper confidence limit or maximum value, depending on data censorship, as described in Appendix D.

[c] Technitium-99 has a distribution coefficient value of 0 mL/g. Therefore, a site-specific fate and transport evaluation for technetium-99 was developed and discussed in Appendix C. Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b) and an evaluation of dilution-attenuation in the saturated zone using the formulas from the EPA *Soil Screening Guidance: User's Guide* (EPA 1996), residual soil concentrations of technetium-99 are predicted to be protective of groundwater and the Columbia River.

[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 RDR/RAWP (DOE-RL 2009).

[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 is available.

[g] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).

[h] Hanford Site-specific background not available. Value is Washington State background from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).

[i] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, total PCBs, 4,4'-DDE, and 4,4'-DDT are not predicted to migrate more than 1.8 m (6.0 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for lead). The distance to groundwater from the bottom of the staging pile area is 11.0 m (36.3 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

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

[k] 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 available
AWQC = ambient water quality criteria
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
EPA = U.S. Environmental Protection Agency
PCB = polychlorinated biphenyl
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)
TPH = total petroleum hydrocarbons
WAC = *Washington Administrative Code*

The RESRAD model was run using various distribution coefficient (K_d) values and unsaturated/uncontaminated vadose zone thicknesses to determine minimum K_d values necessary such that a contaminant will not migrate through the soil column to groundwater in 1,000 years (see Appendix C of the RDR/RAWP [DOE/RL-2009b].) For example, the model shows that a contaminant with a K_d of at least 30 mL/g will not migrate more than 1.8 m (6.0 ft) vertically through the vadose zone in 1,000 years. The residual concentrations of lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, 4,4'-DDE, 4,4'-DDT, and total PCBs are not expected to migrate more than 1.8 m (6.0 ft) vertically in 1,000 years (based on the lowest distribution K_d [lead of 30 mL/g] of the contaminants exceeding RAGs). The distance to groundwater from the bottom of these sampling areas is greater than 2.0 m (6.6 ft). Therefore, these 116-H-5 results are predicted to be protective of groundwater and the Columbia River.

Technetium-99 concentrations exceed the soil RAG for protection of groundwater in the waste staging pile area footprint. Technetium-99 has a K_d value of zero (0) mL/g. Therefore, a site-specific fate and transport evaluation for technetium-99 was developed and discussed in the *116-H-5 RESRAD Calculation Brief for Lead & Tc-99 Groundwater and River Protection,* Calculation No. 0100H-CA-V0163, in Appendix C of this remaining sites verification package (RSVP). Based on this RESRAD modeling, residual soil concentrations of technetium-99 are predicted to be protective of groundwater.

Deep Zone Data Evaluation

Groundwater and the Columbia River protection soil RAGs are exceeded in the deep zone for lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(k)fluoranthene. The deep zone portion of the excavation (Figure 3) extends into groundwater, with approximately 3 m (10 ft) at the base of the excavation existing within historical groundwater fluctuation elevations (114 m [374 ft] to 118 m [378 ft]). The K_d values for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are extremely high (the lowest K_d value being 360 mL/g for benzo(a)anthracene) and would not be expected to partition from the soil column into the groundwater within the deep zone excavation. Additionally, while PAH concentrations were detected at two sediment sampling locations upriver of the 116-H-5 site (Locations SR4 and CR10) in the River Corridor Baseline Risk Assessment (DOE-RL 2010), there were no detections reported for sampling locations downstream of the site. This further suggests that PAHs present at the 116-H-5 site have not impacted the river and downstream locations.

In 2001, the Pacific Northwest National Laboratory (PNNL) and the Washington State Department of Health found the concentration of lead from Columbia River sediment sampling to be 33.2 mg/kg at an upriver location at the Vernita Bridge (PNNL 2003). In 2003, the 100 B/C Pilot Project Risk Assessment found a lead concentration of 61.7 mg/kg in soil sampling in the riparian zone at the Vernita Bridge (BHI 2005). Additionally, the concentrations of lead in the deep zone are within the range of Hanford and Washington statewide background concentrations and are consistent with concentrations detected in the riparian zone reference areas as indicated in the *River Corridor Baseline Risk Assessment Report Volume II,* (DOE-RL 2010), Figure B-20 of Appendix B and page C7-10 of Appendix C7. As a result, the

residual concentrations of lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(k)fluoranthene are predicted to be protective of groundwater and the Columbia River.

Furthermore, a review of groundwater monitoring well sample results for the 100-H Area indicate that lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(k)fluoranthene are not contaminants present within groundwater. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(k)fluoranthene have not been detected in any historical groundwater monitoring well sample results (128 sampling events).

WAC Three-Part Test for Nonradionuclides

Shallow Zone/Overburden/Staging Pile Decision Units

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 116-H-5 waste site is included in the statistical calculations (Appendix D of this RSVP). The results of this evaluation indicate that all residual COPC concentrations pass the three-part test in comparison against applicable RAGs, except for lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene in comparison against the soil RAGs for groundwater and/or river protection in the shallow zone, overburden, and waste staging pile sampling areas. Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentrations of lead, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are not predicted to migrate more than 1.8 m (6.0 ft) vertically within 1,000 years (based on the contaminant with the lowest K_d of 30 mL/g for lead and zinc). The distance to groundwater from the bottom of these sampling areas is greater than 2.0 m (6.6 ft). Therefore, residual concentrations of all constituents are predicted to be 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 in comparison against applicable RAGs, except for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 4,4'-DDE, 4,4'-DDT, and total PCBs in comparison against the soil RAGs for groundwater and/or river protection in one or more sampling areas. However, as described above, based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentrations of these COPCs in the shallow zone, overburden, and staging pile area decision units are not predicted to migrate vertically within 1,000 years (based on the fact that all of these contaminants have K_d values of greater than 80 mL/g). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

Deep Zone Decision Unit

A three-part evaluation was also performed for the statistical and maximum results used in the deep zone decision unit. Table 5 presents the statistical or maximum value associated with each detected constituent. As shown in Table 5, the statistical result for lead exceeds soil RAGs for groundwater and/or river protection. Lead also exceeds greater than 10% of the data for these analytes and has one sample result that exceeds more than twice the lowest RAG value (for groundwater and river protection). However, as described above, the 116-H-5 deep zone lead concentrations are within the range of Hanford and Washington statewide background values and also consistent with concentrations for the Columbia River riparian zone. As shown in Table 5, the maximum results for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene exceed soil RAGs for groundwater and/or river protection. Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene also exceed greater than 10% of the data for these analytes and have one sample result that exceeds more than twice the lowest RAG value (for groundwater and river protection). However, the K_d values for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are extremely high (the lowest K_d value being 360 mL/g for benzo(a)anthracene) and would not be expected to partition from the soil column into the groundwater within the deep zone excavation. These contaminants also have not been detected in samples of downstream sediments for the River Corridor Baseline Risk Assessment. As described above, the residual concentrations of these compounds are predicted to be protective of groundwater and the Columbia River.

Nonradionuclide Direct Contact Hazard Quotient and Carcinogenic Risk RAGs Attained

Nonradionuclide risk requirements include an individual hazard quotient of less than 1.0, a cumulative hazard quotient of less than 1.0, an individual contaminant carcinogenic risk of less than 1×10^{-6}, and a cumulative carcinogenic risk of less than 1×10^{-5}. For the 116-H-5 waste site, these risk values were not calculated for constituents that were either not detected or were detected at concentrations below Hanford Site or Washington State background. All individual hazard quotients for noncarcinogenic constituents were less than 1.0. The cumulative hazard quotient for those noncarcinogenic constituents above background or detected levels is 1.2×10^{-2}. The individual carcinogenic risk values for the carcinogenic constituents detected above background are less than 1×10^{-6}, and the cumulative carcinogenic risk value is 1.0×10^{-6}. The 116-H-5 waste site meets the requirements for the direct contact hazard quotient and excess carcinogenic risk as identified in the RDR/RAWP (DOE-RL 2009b).

Nonradionuclide Groundwater Hazard Quotient and Carcinogenic Risk RAGs Attained

Assessment of the risk requirements for the 116-H-5 waste site included calculation of the hazard quotient and carcinogenic (excess cancer) risk values for groundwater protection for nonradionuclides in Appendix D. 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 distribution coefficients for these contaminants are less than that

necessary to show no migration to groundwater in 1,000 years using the generic site RESRAD model discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b). Based on this model and solubility criteria, a K_d of 80 or greater is required to show no predicted migration to groundwater in 1,000 years. 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. Lead has a K_d value of 30 mg/kg. However, as previously stated, the concentrations of lead detected in the soil samples within the deep zone are within the range of Hanford site and Washington statewide background and consistent with riparian zone reference concentrations (DOE-RL 2010).

All individual hazard quotients for noncarcinogenic constituents are less than 1.0. The cumulative hazard quotient for the 116-H-5 waste site is 6.5×10^{-1}, which is less than 1.0. The highest individual carcinogenic risk value was for aroclor-1254 at 3.4×10^{-6}. However, the single detection of aroclor-1254 was in the staging pile area, where only a K_d of 7.2 mL/g is required to show protection of groundwater based on a minimum vadose zone thickness of 10.0 m (33.3 ft). Therefore, aroclor-1254 is included for completeness, but is not necessary to calculate the groundwater excess cancer risk. All other site nonradionuclide COPCs were not detected, or quantified below background levels. Therefore, residual concentrations of these constituents are predicted to be protective of groundwater and the Columbia River. The cumulative excess cancer risk value (excluding aroclor-1254) is 5.8×10^{-8}. Nonradionuclide risk requirements related to groundwater are met.

Attainment of Radionuclide Direct Exposure RAGs

Table 8 compares the radionuclide cleanup verification results above background from the shallow-zone excavation, deep-zone excavation, overburden, and staging pile area decision units soil samples to direct exposure single radionuclide 15 mrem/year 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, corrected for background, as appropriate. The sixth column presents the single radionuclide 15 mrem/yr dose-equivalence activities, and the last four columns present the radionuclide activities divided by the dose-equivalence activities. As demonstrated by the summation of the fractions for each decision unit, the maximum cumulative dose values contributed by the residual radionuclide populations are predicted to be less than the RAG of 15 mrem/yr above background.

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the verification sampling approach, the field logbooks (WCH 2011a, 2011b), and resulting analytical data with the sampling and data quality requirements specified by the project objectives and performance specifications. The DQA for the 116-H-5 waste site established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances. The evaluation verified that the sample design was sufficient for the purpose of clean site verification. The cleanup verification sample analytical data are stored in the (ENRE) project-specific database for data evaluation prior to its archival in the Hanford Environmental Information System (HEIS) and are summarized in Appendix D. The detailed DQA is presented in Appendix E.

Table 9. Attainment of Radionuclide Direct Exposure Remedial Action Goals (Statistical Samples).

COC/COPC	95% UCL Statistical Values (pCi/g)				Activity Equivalent to 15 mrem/yr Dose [a] (pCi/g)	Fraction			
	SZ Excavation	DZ Excavation	Overburden	SPA		SZ Excavation	DZ Excavation	Overburden	SPA
Carbon-14	0.8	0.898	0.866	--	8.69	0.092	0.10	0.10	--
Cesium-137	--	0.161 (<BG)	--	0.0245 (<BG)	6.2	--	0.026	--	.004
Cobalt-60	--	0.045	--	--	1.4	--	0.032	--	--
Europium-152	--	1.37	--	--	3.3	--	0.42	--	--
Nickel-63	3.72	3.11	--	--	4,013	0.00093	0.00077	--	--
Plutonium-238	--	--	0.264	--	38.8	--	--	0.007	--
Technetium-99	--	--	--	0.499	5.8	--	--	--	0.086
Total beta radiostrontium	0.357	--	--	--	4.5	0.079	--	--	--
Tritium	2.08	2.49	0.57	--	459	0.005	0.005	0.001	--
Uranium-233/234	0.0 (<BG)	0.0 (<BG)	0.06	0.0 (<BG)	1.1	0.0	0.0	0.055	0.0
Uranium-238	0.0 (<BG)	0.0 (<BG)	0.0 (<BG)	0.0	1.1	0.0	0.0	0.0	0.0
					Total	0.177	0.584	0.163	0.09
					Equivalent Dose (mrem/yr)	2.65	8.76	2.45	1.35

[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).

-- = not applicable
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
DZ = deep zone
SPA = staging pile area
SZ = shallow zone
UCL = upper confidence limit

SUMMARY FOR INTERIM CLOSURE

The 116-H-5 waste site has been evaluated in accordance with the Remaining Sites ROD (EPA 1999) and the RDR/RAWP (DOE-RL 2009b). The remaining soils at this site have been sampled, analyzed, and modeled. Verification sampling was performed and the analytical results (including consideration of modeling) indicate that the residual concentrations of COPCs at this site meet the RAOs for direct exposure, groundwater protection, and river protection, except for lead and PAHs in the deep zone that exceed groundwater and river protection RAGs. Further supplemental evaluation demonstrates protectiveness for lead and PAHs in the deep zone. In accordance with this evaluation, the verification sampling results support a reclassification of the 116-H-5 waste site to Interim Closed Out.

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APPENDIX A

ECOLOGICAL RISK COMPARISON TABLE

Table A-1. Contaminants Exceeding Ecological Screening Levels for the 116-H-5 Waste Site [a].

Hazardous Substance		2007 WAC 173-340 Table 749-3			EPA Ecological Soil Screening Levels [b]				Maximum or Statistical Result
		Plants	Soil Biota	Wildlife	Plants	Soil Biota	Avian [c]	Mammalian [c]	
Metals (mg/kg)									
Background									
Antimony	5	5	--	--	--	78	--	0.27	0.414 (<BG)
Arsenic V	6.5 [d]	10	60	132	18	--	43	46	14.0
Boron	--	0.5	--	--	--	--	--	--	2.4
Lead	10.2	50	500	118	120	1,700	11	56	33.4
Manganese	512	1,100 [e]	--	1,500	220	450	4,300	4,000	283 (<BG)
Vanadium	85.1	2	--	--	--	--	7.8	280	48.2 (<BG)
Zinc	67.8	86 [e]	200	360	160	120	46	79	47.2 (<BG)
DDT/DDD/DDE (total)	--	--	--	0.75	--	--	0.093	0.021	0.0453

NOTE: Shaded cells are exceeded by the maximum or the statistical result.

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

[b] Available on the internet at (www.epa.gov/ecotox/ecossl).

[c] Wildlife.

[d] The Hanford Site background for arsenic is 6.5 mg/kg. An 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-96-17, Rev. 6.

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

-- = not available
BG = background
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
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

IN-PROCESS SAMPLES

Table B-1. 116-H-5 Deep Zone and Staging Pile Area Radionuclide Data Results. (4 Pages)

Sample Location	HEIS Number	Sample Date	Americium-241 GEA			Barium-133			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	pCi/g	Q	MDA
DZ-1	J19YD1	5/18/2010	0.074	U	0.074	0.062	U	0.062	0.718	U	0.918	0.069	U	0.069	0.086	U	0.086	0.174	U	0.174	0.269	U	0.269
Duplicate of DZ-1	J19YF3	5/18/2010	0.091	U	0.091	0.064	U	0.064	0.903		0.883	0.074	U	0.074	0.085	U	0.085	0.192	U	0.192	0.272	U	0.272
DZ-2	J19YD2	5/18/2010	0.093	U	0.093	0.107	U	0.107	0.203	U	0.85	0.089	U	0.089	0.082	U	0.082	0.24	U	0.24	0.278	U	0.278
DZ-3	J19YD3	5/18/2010	0.367	U	0.367	0.102	U	0.102	1.23		0.881	0.095	U	0.095	0.108	U	0.108	0.23	U	0.23	0.317	U	0.317
DZ-4	J19YD4	5/18/2010	0.329	U	0.329	0.094	U	0.094	0.534	U	0.841	0.078	U	0.078	0.103	U	0.103	0.209	U	0.209	0.249	U	0.249
DZ-5	J19YD5	5/18/2010	0.274	U	0.274	0.083	U	0.083	0.267	U	0.961	0.056	U	0.056	0.068	U	0.068	0.162	U	0.162	0.207	U	0.207
DZ-6	J19YD6	5/18/2010	0.313	U	0.313	0.088	U	0.088	1.15		0.809	0.089	U	0.089	0.087	U	0.087	0.182	U	0.182	0.256	U	0.256
DZ-7	J19YD7	5/18/2010	0.313	U	0.313	0.09	U	0.09	0.725	U	0.83	0.594		0.087	0.145		0.076	2.28		0.2	0.284	U	0.284
DZ-8	J19YD8	5/18/2010	0.094	U	0.094	0.064	U	0.064	0.513	U	0.881	0.071	U	0.071	0.086	U	0.086	0.198	U	0.198	0.291	U	0.291
DZ-9	J19YD9	5/18/2010	0.117	U	0.117	0.123	U	0.123	0.581	U	0.86	0.114	U	0.114	0.095	U	0.095	0.28	U	0.28	0.34	U	0.34
DZ-10	J19YF0	5/18/2010	0.151	U	0.151	0.055	U	0.055	0.509	U	0.8	0.055	U	0.055	0.072	U	0.072	0.181	U	0.181	0.253	U	0.253
DZ-11	J19YF1	5/18/2010	0.169	U	0.169	0.062	U	0.062	1.41		0.901	0.066	U	0.066	0.055	U	0.055	0.182	U	0.182	0.197	U	0.197
DZ-12	J19YF2	5/18/2010	0.305	U	0.305	0.096	U	0.096	0.766	U	0.9	0.078	U	0.078	0.086	U	0.086	0.183	U	0.183	0.294	U	0.294
SPA-8	J19YJ4	5/17/2010	0.321	U	0.321	0.098	U	0.098	0.039	U	0.51	0.118	U	0.118	0.067	U	0.067	0.181	U	0.181	0.223	U	0.223
Duplicate of SPA-8	J19YJ9	5/17/2010	0.035	U	0.035	0.026	U	0.026	-0.064	U	0.497	0.136		0.036	0.031	U	0.031	0.073	U	0.073	0.089	U	0.089
SPA-1	J19YH7	5/17/2010	0.124	U	0.124	0.054	U	0.054	-0.091	U	0.496	0.065	U	0.065	0.062	U	0.062	0.164	U	0.164	0.193	U	0.193
SPA-2	J19YH8	5/17/2010	0.12	U	0.12	0.121	U	0.121	-0.085	U	0.534	0.253	U	0.253	0.112	U	0.112	0.291	U	0.291	0.395	U	0.395
SPA-3	J19YH9	5/17/2010	0.107	U	0.107	0.083	U	0.083	0.136	U	0.51	0.234		0.092	0.094	U	0.094	0.255	U	0.255	0.298	U	0.298
SPA-4	J19YJ0	5/17/2010	0.178	U	0.178	0.079	U	0.079	-0.029	U	0.489	0.1	U	0.1	0.057	U	0.057	0.186	U	0.186	0.2	U	0.2
SPA-5	J19YJ1	5/17/2010	0.159	U	0.159	0.067	U	0.067	-0.014	U	0.525	0.11		0.077	0.078	U	0.078	0.204	U	0.204	0.25	U	0.25
SPA-6	J19YJ2	5/17/2010	0.128	U	0.128	0.13	U	0.13	0.145	U	0.519	0.307		0.132	0.114	U	0.114	0.287	U	0.287	0.355	U	0.355
SPA-7	J19YJ3	5/17/2010	0.085	U	0.085	0.067	U	0.067	-0.038	U	0.507	0.069	U	0.069	0.081	U	0.081	0.197	U	0.197	0.253	U	0.253
SPA-9	J19YJ5	5/17/2010	0.089	U	0.089	0.092	U	0.092	0.048	U	0.515	0.238		0.09	0.084	U	0.084	0.196	U	0.196	0.277	U	0.277
SPA-10	J19YJ6	5/17/2010	0.115	U	0.115	0.116	U	0.116	0.141	U	0.502	0.333		0.119	0.092	U	0.092	0.272	U	0.272	0.325	U	0.325
SPA-11	J19YJ7	5/17/2010	0.052	U	0.052	0.023	U	0.023	-0.003	U	0.522	0.056		0.028	0.025	U	0.025	0.064	U	0.064	0.085	U	0.085
SPA-12	J19YJ8	5/17/2010	0.045	U	0.045	0.044	U	0.044	-0.046	U	0.503	0.089		0.048	0.039	U	0.039	0.104	U	0.104	0.128	U	0.128

Acronyms and notes apply to all of the tables in this appendix
B = analyte detected below PQL; therefore result is estimated
D = diluted
J = estimate
MDA = miniumum detectable activity
PQL = practical quantitation limit
Q = qualifier
U = undetected

Table B-1. 116-H-5 Deep Zone and Staging Pile Area Radionuclide Data Results. (4 Pages)

Sample Location	HEIS Number	Sample Date	Europium-155			Nickel-63			Plutonium-238			Plutonium-239/240			Potassium-40			Radium-226			Radium-228		
			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
DZ-1	J19YD1	5/18/2010	0.135	U	0.135	-0.528	U	2.97	0.005	U	0.089	0.01	U	0.07	15.1		0.78	0.502		0.135	0.8		0.302
Duplicate of DZ-1	J19YF3	5/18/2010	0.14	U	0.14	0.44	U	2.98	0.051	U	0.194	0	U	0.194	15.1		0.852	0.576		0.128	0.539		0.333
DZ-2	J19YD2	5/18/2010	0.174	U	0.174	-0.578	U	3.03	-0.005	U	0.091	-0.01	U	0.057	9.42		0.79	0.425		0.165	0.349		0.338
DZ-3	J19YD3	5/18/2010	0.207	U	0.207	0.524	U	3.17	-0.027	U	0.087	-0.005	U	0.052	12.4		0.859	0.42		0.168	0.739		0.232
DZ-4	J19YD4	5/18/2010	0.195	U	0.195	-0.498	U	3.02	-0.005	U	0.098	0	U	0.044	10.9		1.35	0.437		0.155	0.654		0.349
DZ-5	J19YD5	5/18/2010	0.184	U	0.184	0.087	U	3.44	0.017	U	0.111	-0.006	U	0.071	11.5		0.709	0.495		0.126	0.828		0.258
DZ-6	J19YD6	5/18/2010	0.169	U	0.169	-0.158	U	3.11	0.014	U	0.142	0.007	U	0.055	11		1.05	0.505		0.154	0.571		0.314
DZ-7	J19YD7	5/18/2010	0.245	U	0.245	13.2		3.19	0.006	U	0.114	0.028	U	0.053	12		0.622	0.417		0.166	0.402		0.364
DZ-8	J19YD8	5/18/2010	0.145	U	0.145	-0.232	U	3.05	0.005	U	0.047	-0.005	U	0.037	14.2		0.809	0.586		0.142	0.434		0.393
DZ-9	J19YD9	5/18/2010	0.256	U	0.256	0	U	2.96	-0.017	U	0.063	-0.006	U	0.044	13.2		1.06	0.619		0.24	0.98		0.438
DZ-10	J19YF0	5/18/2010	0.141	U	0.141	0.914	U	3	0	U	0.063	0	U	0.039	12.4		0.609	0.402		0.111	0.551		0.293
DZ-11	J19YF1	5/18/2010	0.17	U	0.17	1.5	U	2.8	0.057	U	0.275	0.086	U	0.219	13		0.588	0.483		0.101	0.641		0.239
DZ-12	J19YF2	5/18/2010	0.194	U	0.194	1.4	U	2.75	0.082	U	0.392	0.041	U	0.313	11.5		0.61	0.49		0.15	0.373	U	0.377
SPA-8	J19YJ4	5/17/2010	0.191	U	0.191	1.15	U	3.63	-0.075	U	0.357	0	U	0.285	12.3		0.628	0.506		0.14	0.5		0.255
Duplicate of SPA-8	J19YJ9	5/17/2010	0.057	U	0.057	1.23	U	3	0	U	0.268	0	U	0.267	15.7		0.301	0.567		0.057	0.829		0.137
SPA-1	J19YH7	5/17/2010	0.128	U	0.128	0.588	U	3.18	0.056	U	0.269	0.028	U	0.215	12.7		0.574	0.404		0.095	0.608		0.231
SPA-2	J19YH8	5/17/2010	0.222	U	0.222	-0.083	U	3.15	0.033	U	0.256	0.033	U	0.255	14.8		1.08	0.505		0.239	0.818		0.451
SPA-3	J19YH9	5/17/2010	0.169	U	0.169	1.58	U	3.42	-0.039	U	0.376	-0.039	U	0.3	15.6		1.11	0.689		0.168	0.842		0.466
SPA-4	J19YJ0	5/17/2010	0.177	U	0.177	0.82	U	3.1	0	U	0.347	0.108	U	0.277	12.4		0.709	0.39		0.116	0.557		0.282
SPA-5	J19YJ1	5/17/2010	0.164	U	0.164	1.2	U	3.02	0	U	0.373	0.049	U	0.373	12.3		0.885	0.565		0.109	1.03		0.28
SPA-6	J19YJ2	5/17/2010	0.248	U	0.248	1.32	U	3.13	0	U	0.358	0.032	U	0.248	12.3		1.09	0.494		0.205	1.05		0.518
SPA-7	J19YJ3	5/17/2010	0.146	U	0.146	1.08	U	3.14	0.124	U	0.396	-0.041	U	0.316	15.6		0.834	0.395		0.138	0.775		0.256
SPA-9	J19YJ5	5/17/2010	0.188	U	0.188	0.856	U	3.08	0.074	U	0.354	0.037	U	0.283	11.8		0.881	0.37		0.159	0.736		0.363
SPA-10	J19YJ6	5/17/2010	0.251	U	0.251	1.6	U	3.11	-0.04	U	0.302	0	U	0.302	14.1		1.07	0.832		0.213	1.06		0.474
SPA-11	J19YJ7	5/17/2010	0.054	U	0.054	0.732	U	3.08	-0.032	U	0.248	0	U	0.247	12.9		0.258	0.496		0.048	0.676		0.098
SPA-12	J19YJ8	5/17/2010	0.084	U	0.084	0.22	U	3.33	0.034	U	0.258	0	U	0.258	14.6		0.43	0.551		0.085	0.75		0.178

Table B-1. 116-H-5 Deep Zone and Staging Pile Area Radionuclide Data Results. (4 Pages)

Sample Location	HEIS Number	Sample Date	Silver-108			Technetium-99			Thorium-228 GEA			Thorium-232 GEA			Total Beta			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	pCi/g	Q	MDA
DZ-1	J19YD1	5/18/2010	0.047	U	0.047	0.13	U	0.382	0.668		0.086	0.8		0.302	-0.051	U	0.226	4.53		2.71	0.766		0.279
Duplicate of DZ-1	J19YF3	5/18/2010	0.052	U	0.052	-0.086	U	0.39	0.731		0.086	0.539		0.333	-0.084	U	0.217	0.202	U	3.1	0.567		0.181
DZ-2	J19YD2	5/18/2010	0.061	U	0.061	0.175	U	0.434	0.505		0.105	0.349		0.338	-0.06	U	0.291	2.13	U	2.6	0.318		0.244
DZ-3	J19YD3	5/18/2010	0.072	U	0.072	0.289	U	0.424	0.876		0.163	0.739		0.232	0.194	U	0.326	1.79	U	2.58	0.38		0.242
DZ-4	J19YD4	5/18/2010	0.06	U	0.06	0.166	U	0.375	0.586		0.147	0.654		0.349	0.059	U	0.257	2.55	U	2.64	0.395		0.202
DZ-5	J19YD5	5/18/2010	0.048	U	0.048	0.146	U	0.492	0.586		0.087	0.828		0.258	0.071	U	0.311	1.72	U	2.76	0.87		0.215
DZ-6	J19YD6	5/18/2010	0.055	U	0.055	0.194	U	0.384	0.544		0.091	0.571		0.314	0.051	U	0.244	2.32	U	2.55	0.702		0.244
DZ-7	J19YD7	5/18/2010	0.054	U	0.054	0.114	U	0.37	0.613		0.09	0.402		0.364	-0.065	U	0.285	4.34		2.59	0.648		0.236
DZ-8	J19YD8	5/18/2010	0.052	U	0.052	0.227	U	0.442	0.691		0.088	0.434		0.393	0.012	U	0.266	1.06	U	2.65	0.43		0.206
DZ-9	J19YD9	5/18/2010	0.082	U	0.082	0.15	U	0.387	0.557		0.147	0.98		0.438	-0.11	U	0.324	1.91	U	2.62	0.709		0.209
DZ-10	J19YF0	5/18/2010	0.047	U	0.047	-0.013	U	0.408	0.607		0.075	0.551		0.293	-0.053	U	0.272	2.53		2.53	0.594		0.182
DZ-11	J19YF1	5/18/2010	0.047	U	0.047	-0.029	U	0.385	0.75		0.126	0.641		0.239	-0.02	U	0.228	1.06	U	2.96	0.371		0.149
DZ-12	J19YF2	5/18/2010	0.066	U	0.066	0.012	U	0.4	0.615		0.175	0.373	U	0.377	0.006	U	0.207	0.297	U	3.03	0.553		0.184
SPA-8	J19YJ4	5/17/2010	0.054	U	0.054	0.012	U	0.42	0.573		0.079	0.5		0.255	0.122	U	0.327	-0.83	U	7.52	0.85		0.21
Duplicate of SPA-8	J19YJ9	5/17/2010	0.019	U	0.019	0.028	U	0.404	0.831		0.036	0.829		0.137	0.013	U	0.296	0.457	U	7.26	0.33		0.194
SPA-1	J19YH7	5/17/2010	0.046	U	0.046	0.048	U	0.453	0.455		0.064	0.608		0.231	0.013	U	0.289	1.42	U	7.5	0.236		0.164
SPA-2	J19YH8	5/17/2010	0.08	U	0.08	0.13	U	0.462	0.525		0.217	0.818		0.451	0.007	U	0.313	-0.359	U	7.59	0.552		0.264
SPA-3	J19YH9	5/17/2010	0.054	U	0.054	0.181	U	0.42	1.04		0.108	0.842		0.466	0.053	U	0.265	-2.56	U	7.38	0.32		0.204
SPA-4	J19YJ0	5/17/2010	0.051	U	0.051	0.082	U	0.418	0.564		0.094	0.557		0.282	0.088	U	0.325	-1.24	U	7.16	0.366		0.28
SPA-5	J19YJ1	5/17/2010	0.053	U	0.053	0.086	U	0.399	0.927		0.137	1.03		0.28	-0.028	U	0.244	-2.27	U	8.46	0.488		0.208
SPA-6	J19YJ2	5/17/2010	0.092	U	0.092	0.195	U	0.428	0.687		0.134	1.05		0.518	-0.038	U	0.317	2.46	U	7.44	0.474		0.202
SPA-7	J19YJ3	5/17/2010	0.047	U	0.047	0.034	U	0.435	0.697		0.097	0.775		0.256	-0.067	U	0.314	-1.83	U	8.27	1.01		0.257
SPA-9	J19YJ5	5/17/2010	0.056	U	0.056	0.086	U	0.417	0.693		0.098	0.736		0.363	0.033	U	0.29	1.25	U	8.79	0.497		0.055
SPA-10	J19YJ6	5/17/2010	0.082	U	0.082	0.144	U	0.426	0.666		0.154	1.06		0.474	0.004	U	0.328	-1.06	U	7.45	0.436		0.052
SPA-11	J19YJ7	5/17/2010	0.017	U	0.017	0.056	U	0.444	0.7		0.031	0.676		0.098	0.074	U	0.332	-1.64	U	7.42	0.496		0.158
SPA-12	J19YJ8	5/17/2010	0.032	U	0.032	-0.015	U	0.43	0.756		0.057	0.75		0.178	0.049	U	0.364	-1.72	U	7.77	0.692		0.165

Table B-1. 116-H-5 Deep Zone and Staging Pile Area Radionuclide Data Results. (4 Pages)

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
DZ-1	J19YD1	5/18/2010	0	U	0.338	0.336	U	0.336	0.62		0.279	7.78	U	7.78
Duplicate of DZ-1	J19YF3	5/18/2010	0	U	0.219	0.372	U	0.372	0.543		0.181	9.63	U	9.63
DZ-2	J19YD2	5/18/2010	0	U	0.295	0.42	U	0.42	0.51		0.244	10	U	10
DZ-3	J19YD3	5/18/2010	0	U	0.293	0.467	U	0.467	0.57		0.242	11.8	U	11.8
DZ-4	J19YD4	5/18/2010	0.064	U	0.244	0.391	U	0.391	0.501		0.202	11.1	U	11.1
DZ-5	J19YD5	5/18/2010	0.136	U	0.26	0.355	U	0.355	0.533		0.215	7.77	U	7.77
DZ-6	J19YD6	5/18/2010	0.039	U	0.296	0.34	U	0.34	0.766		0.244	9.78	U	9.78
DZ-7	J19YD7	5/18/2010	0	U	0.286	0.432	U	0.432	0.833		0.236	9.63	U	9.63
DZ-8	J19YD8	5/18/2010	0.033	U	0.249	0.34	U	0.34	0.349		0.206	10.5	U	10.5
DZ-9	J19YD9	5/18/2010	0.066	U	0.253	0.598	U	0.598	0.546		0.209	12.7	U	12.7
DZ-10	J19YF0	5/18/2010	0	U	0.22	0.326	U	0.326	0.57		0.182	6.66	U	6.66
DZ-11	J19YF1	5/18/2010	0	U	0.181	0.371	U	0.371	0.488		0.149	7.59	U	7.59
DZ-12	J19YF2	5/18/2010	0	U	0.223	0.39	U	0.39	0.481		0.184	9.86	U	9.86
SPA-8	J19YJ4	5/17/2010	0.033	U	0.254	0.413	U	0.413	0.302		0.21	8.54	U	8.54
Duplicate of SPA-8	J19YJ9	5/17/2010	0.031	U	0.235	0.148	U	0.148	0.635		0.194	4.79	U	4.79
SPA-1	J19YH7	5/17/2010	0.052	U	0.198	0.302	U	0.302	0.279		0.164	7.01	U	7.01
SPA-2	J19YH8	5/17/2010	0	U	0.32	0.529	U	0.529	0.345		0.264	12.6	U	12.6
SPA-3	J19YH9	5/17/2010	0.065	U	0.247	0.421	U	0.421	0.427		0.204	10.4	U	10.4
SPA-4	J19YJ0	5/17/2010	0.133	U	0.339	0.37	U	0.37	0.44		0.28	7.81	U	7.81
SPA-5	J19YJ1	5/17/2010	0.033	U	0.251	0.359	U	0.359	0.38		0.208	8.44	U	8.44
SPA-6	J19YJ2	5/17/2010	0.064	U	0.244	0.576	U	0.576	0.791		0.202	12.5	U	12.5
SPA-7	J19YJ3	5/17/2010	0		0.312	0.373	U	0.373	0.774		0.257	8.73	U	8.73
SPA-9	J19YJ5	5/17/2010	0.024	U	0.044	0.38	U	0.38	0.491		0.036	9.02	U	9.02
SPA-10	J19YJ6	5/17/2010	0.005	U	0.039	0.551	U	0.551	0.428		0.047	11.4	U	11.4
SPA-11	J19YJ7	5/17/2010	0.05	U	0.191	0.145	U	0.145	0.393		0.158	2.76	U	2.76
SPA-12	J19YJ8	5/17/2010	0	U	0.2	0.203	U	0.203	0.346		0.165	4.64	U	4.64

Table B-2. 116-H-5 Deep Zone and Staging Pile Area Inorganic Data Results. (5 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
DZ-1	J19YD1	5/18/2010	5570		14.7	0.737	U	0.74	4.46		0.74	42.1		0.37	0.164		0.15	1.1	B	1.47
Duplicate of DZ-1	J19YF3	5/18/2010	5830		18.6	0.929	U	0.93	5.3		0.93	45.4		0.47	0.164	B	0.19	1.15	B	1.86
DZ-2	J19YD2	5/18/2010	5380		20.7	1.03	U	1.03	3.41		1.03	67.9		0.52	0.147	B	0.21	0.801	B	2.07
DZ-3	J19YD3	5/18/2010	6880		21	1.05	U	1.05	3.95		1.05	61.4		0.52	0.2	B	0.21	1.6	B	2.1
DZ-4	J19YD4	5/18/2010	6780		13.9	0.696	U	0.7	5.3		0.7	60.8		0.35	0.185		0.14	1.44		1.39
DZ-5	J19YD5	5/18/2010	7410		15.8	0.788	U	0.79	17.7		0.79	57.6		0.39	0.211		0.16	1.22	B	1.58
DZ-6	J19YD6	5/18/2010	6400		14.3	0.262	B	0.71	5.99		0.71	47.7		0.36	0.176		0.14	1.08	B	1.43
DZ-7	J19YD7	5/18/2010	7710		15.9	0.453	B	0.79	8.1		0.79	57.1		0.4	0.199		0.16	1.46	B	1.59
DZ-8	J19YD8	5/18/2010	5390		19.3	0.967	U	0.97	3.23		0.97	56.6		0.48	0.147	B	0.19	0.888	B	1.93
DZ-9	J19YD9	5/18/2010	5790		17.4	0.87	U	0.87	5.1		0.87	50.7		0.44	0.174		0.17	1.25	B	1.74
DZ-10	J19YF0	5/18/2010	5250		15	0.748	U	0.75	4.68		0.75	59.7		0.37	0.157		0.15	0.902	B	1.5
DZ-11	J19YF1	5/18/2010	6470		16.8	0.842	U	0.84	5.85		0.84	58.2		0.42	0.191		0.17	1.18	B	1.68
DZ-12	J19YF2	5/18/2010	6360		15.6	0.78	U	0.78	5.39		0.78	51.9		0.39	0.179		0.16	1.07	B	1.56
SPA-8	J19YJ4	5/17/2010	7140		13.3	0.346	B	0.66	7.32		0.66	66.8		0.33	0.21		0.13	3.26		1.33
Duplicate of SPA-8	J19YJ9	5/17/2010	7420		16.3	0.813	U	0.81	7.94		0.81	69.3		0.41	0.229		0.16	3.47		1.63
SPA-1	J19YH7	5/17/2010	5600		17	0.297	B	0.85	2.41		0.85	42.1		0.43	0.142	B	0.17	1.26	B	1.7
SPA-2	J19YH8	5/17/2010	9000		14.3	0.29	B	0.72	4.14		0.72	75.1		0.36	0.269		0.14	2.11		1.43
SPA-3	J19YH9	5/17/2010	9700		16.2	0.331	B	0.81	4.38		0.81	84		0.41	0.293		0.16	2.25		1.62
SPA-4	J19YJ0	5/17/2010	6850		12.9	0.288	B	0.64	2.53		0.64	54.6		0.32	0.181		0.13	1.31		1.29
SPA-5	J19YJ1	5/17/2010	8470		16.2	0.286	B	0.81	4.07		0.81	74.4		0.41	0.26		0.16	2.16		1.62
SPA-6	J19YJ2	5/17/2010	6710		15.5	0.334	B	0.78	5.25		0.78	82.3		0.39	0.226		0.16	6.47		1.55
SPA-7	J19YJ3	5/17/2010	7450		15	0.329	B	0.75	6.25		0.75	63.2		0.37	0.196		0.15	2.55		1.5
SPA-9	J19YJ5	5/17/2010	7060		12.6	0.281	B	0.63	6.11		0.63	76.8		0.31	0.216		0.13	4.16		1.26
SPA-10	J19YJ6	5/17/2010	6080		14	0.253	B	0.7	5.96		0.7	77.5		0.35	0.19		0.14	4.84		1.4
SPA-11	J19YJ7	5/17/2010	7710		14	0.393	B	0.7	8.71		0.7	66.7		0.35	0.227		0.14	3.03		1.4
SPA-12	J19YJ8	5/17/2010	7290		12.7	0.299	B	0.64	14.2		0.64	69.5		0.32	0.218		0.13	3.32		1.27

Table B-2. 116-H-5 Deep Zone and Staging Pile Area Inorganic Data Results. (5 Pages)

Sample Location	HEIS Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
DZ-1	J19YD1	5/18/2010	0.057	B	0.18	5100		14.7	8.71		0.74	5.03		2.21	12.8		1.47	0.21	U	0.21
Duplicate of DZ-1	J19YF3	5/18/2010	0.097	B	0.23	5360		18.6	9.56		0.93	5.58		2.79	12.7		1.86	0.21	U	0.21
DZ-2	J19YD2	5/18/2010	0.088	B	0.26	5120		20.7	10.7		1.03	7.58		3.1	13.6		2.07	0.21	U	0.21
DZ-3	J19YD3	5/18/2010	0.262	U	0.26	5660		21	15.6		1.05	5.96		3.15	12.8		2.1	0.21	U	0.21
DZ-4	J19YD4	5/18/2010	0.061	B	0.17	6420		13.9	11.5		0.7	5.77		2.09	13.4		1.39	0.21	U	0.21
DZ-5	J19YD5	5/18/2010	0.069	B	0.2	5060		15.8	11.3		0.79	5.8		2.36	13.5		1.58	0.21	U	0.21
DZ-6	J19YD6	5/18/2010	0.048	B	0.18	5340		14.3	11.1		0.71	5.47		2.14	13.8		1.43	0.21	U	0.21
DZ-7	J19YD7	5/18/2010	0.13	B	0.2	7540		15.9	19.9		0.79	5.88		2.38	14.9		1.59	0.21	U	0.21
DZ-8	J19YD8	5/18/2010	0.065	B	0.24	4450		19.3	8.55		0.97	4.97		2.9	11.9		1.93	0.21	U	0.21
DZ-9	J19YD9	5/18/2010	0.058	B	0.22	4660		17.4	9.92		0.87	5.87		2.61	13.4		1.74	0.21	U	0.21
DZ-10	J19YF0	5/18/2010	0.055	B	0.19	4590		15	7.37		0.75	6.19		2.25	14.1		1.5	0.21	U	0.21
DZ-11	J19YF1	5/18/2010	0.132	B	0.21	5760		16.8	12		0.84	5.35		2.53	14.9		1.68	0.21	U	0.21
DZ-12	J19YF2	5/18/2010	0.115	B	0.2	5590		15.6	10.3		0.78	5.36		2.34	13.6		1.56	0.21	U	0.21
SPA-8	J19YJ4	5/17/2010	0.082	B	0.17	4390		13.3	11.2		0.66	5.67		1.99	13.6		1.33	0.2	U	0.2
Duplicate of SPA-8	J19YJ9	5/17/2010	0.092	B	0.2	4500		16.3	11.1		0.81	5.96		2.44	14.8		1.63	0.2	U	0.2
SPA-1	J19YH7	5/17/2010	0.212	U	0.21	6170		17	9.89		0.85	4.98		2.55	11.6		1.7	0.2	U	0.2
SPA-2	J19YH8	5/17/2010	0.05	B	0.18	4580		14.3	12.3		0.72	6.44		2.15	13.3		1.43	0.2	U	0.2
SPA-3	J19YH9	5/17/2010	0.05	B	0.2	4270		16.2	12.2		0.81	6.86		2.43	13.6		1.62	0.2	U	0.2
SPA-4	J19YJ0	5/17/2010	0.035	B	0.16	4450		12.9	10.7		0.64	5.44		1.93	12.2		1.29	0.2	U	0.2
SPA-5	J19YJ1	5/17/2010	0.056	B	0.2	3700		16.2	11.1		0.81	6.09		2.43	12.1		1.62	0.2	U	0.2
SPA-6	J19YJ2	5/17/2010	0.141	B	0.19	4690		15.5	10.1		0.78	5.34		2.33	15.3		1.55	0.2	U	0.2
SPA-7	J19YJ3	5/17/2010	0.051	B	0.19	6240		15	13		0.75	5.83		2.24	13.6		1.5	0.2	U	0.2
SPA-9	J19YJ5	5/17/2010	0.104	B	0.16	4430		12.6	11.5		0.63	5.7		1.88	14.1		1.26	0.2	U	0.2
SPA-10	J19YJ6	5/17/2010	0.105	B	0.18	3950		14	10.1		0.7	4.84		2.1	14.6		1.4	0.2	U	0.2
SPA-11	J19YJ7	5/17/2010	0.083	B	0.18	4480		14	11.7		0.7	5.87		2.1	12.9		1.4	0.2	U	0.2
SPA-12	J19YJ8	5/17/2010	0.091	B	0.16	5100		12.7	11.3		0.64	6.05		1.91	13.3		1.27	0.2	U	0.2

Table B-2. 116-H-5 Deep Zone and Staging Pile Area Inorganic Data Results. (5 Pages)

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
DZ-1	J19YD1	5/18/2010	15500		14.7	12.5		0.74	3430		3.68	220		0.74	0.011	B	0.03	0.213	B	0.74
Duplicate of DZ-1	J19YF3	5/18/2010	16200		18.6	14.3		0.93	3950		4.65	246		0.93	0.027		0.03	0.346	B	0.93
DZ-2	J19YD2	5/18/2010	20400		20.7	7.09		1.03	4290		5.17	269		1.03	0.011	B	0.03	0.288	B	1.03
DZ-3	J19YD3	5/18/2010	18600		21	7.83		1.05	4410		5.24	259		1.05	0.012	B	0.03	0.315	B	1.05
DZ-4	J19YD4	5/18/2010	17500		13.9	13.1		0.7	4250		3.48	264		0.7	0.01	B	0.03	0.299	B	0.7
DZ-5	J19YD5	5/18/2010	17800		15.8	58.2		0.79	4230		3.94	274		0.79	0.015	B	0.03	0.202	B	0.79
DZ-6	J19YD6	5/18/2010	16500		14.3	15.5		0.71	4120		3.56	251		0.71	0.009	B	0.03	0.264	B	0.71
DZ-7	J19YD7	5/18/2010	18300		15.9	22.8		0.79	4270		3.97	283		0.79	0.159		0.03	0.32	B	0.79
DZ-8	J19YD8	5/18/2010	15500		19.3	7.78		0.97	3270		4.83	230		0.97	0.012	B	0.03	0.248	B	0.97
DZ-9	J19YD9	5/18/2010	17800		17.4	14.4		0.87	4120		4.35	247		0.87	0.025	U	0.03	0.367	B	0.87
DZ-10	J19YF0	5/18/2010	17000		15	12.7		0.75	3130		3.74	257		0.75	0.026	U	0.03	0.239	B	0.75
DZ-11	J19YF1	5/18/2010	17400		16.8	15.8		0.84	3970		4.21	262		0.84	0.026	U	0.03	0.617	B	0.84
DZ-12	J19YF2	5/18/2010	17000		15.6	14.7		0.78	4250		3.9	251		0.78	0.01	B	0.03	0.262	B	0.78
SPA-8	J19YJ4	5/17/2010	17300		13.3	56.5		0.66	3910		3.32	262		0.66	0.028	U	0.03	0.364	B	0.66
Duplicate of SPA-8	J19YJ9	5/17/2010	17800		16.3	59.8		0.81	3960		4.06	271		0.81	0.026	U	0.03	0.401	B	0.81
SPA-1	J19YH7	5/17/2010	15400		17	4.63		0.85	3980		4.25	232		0.85	0.026	U	0.03	0.318	B	0.85
SPA-2	J19YH8	5/17/2010	19900		14.3	9.7		0.72	4190		3.59	310		0.72	0.027	U	0.03	0.374	B	0.72
SPA-3	J19YH9	5/17/2010	20600		16.2	9.45		0.81	4330		4.06	330		0.81	0.028	U	0.03	0.331	B	0.81
SPA-4	J19YJ0	5/17/2010	16900		12.9	3.61		0.64	3880		3.22	260		0.64	0.024	U	0.02	0.282	B	0.64
SPA-5	J19YJ1	5/17/2010	18000		16.2	9.15		0.81	3850		4.05	289		0.81	0.025	U	0.03	0.338	B	0.81
SPA-6	J19YJ2	5/17/2010	16600		15.5	32.9		0.78	3520		3.88	247		0.78	0.023	B	0.03	0.495	B	0.78
SPA-7	J19YJ3	5/17/2010	17500		15	19.3		0.75	4410		3.74	259		0.75	0.024	U	0.02	0.344	B	0.75
SPA-9	J19YJ5	5/17/2010	17000		12.6	43.4		0.63	3890		3.14	257		0.63	0.015	B	0.03	0.348	B	0.63
SPA-10	J19YJ6	5/17/2010	15300		14	42.8		0.7	3460		3.49	226		0.7	0.057		0.03	0.377	B	0.7
SPA-11	J19YJ7	5/17/2010	18300		14	65.6		0.7	4190		3.51	275		0.7	0.025	U	0.03	0.304	B	0.7
SPA-12	J19YJ8	5/17/2010	17800		12.7	87.1		0.64	3800		3.18	263		0.64	0.026	U	0.03	0.312	B	0.64

Table B-2. 116-H-5 Deep Zone and Staging Pile Area Inorganic Data Results. (5 Pages)

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
DZ-1	J19YD1	5/18/2010	7.68		1.84	769		73.7	0.221	U	0.22	496		4.42	0.737	U	0.74	178		36.8
Duplicate of DZ-1	J19YF3	5/18/2010	8.62		2.32	802		92.9	0.279	U	0.28	563		5.57	0.929	U	0.93	174		46.5
DZ-2	J19YD2	5/18/2010	12.1		2.58	658		103	0.31	U	0.31	742		6.2	1.03	U	1.03	285		51.7
DZ-3	J19YD3	5/18/2010	12		2.62	978		105	0.315	U	0.32	1330		6.29	1.05	U	1.05	267		52.4
DZ-4	J19YD4	5/18/2010	9.86		1.74	975		69.6	0.209	U	0.21	1140		4.18	0.696	U	0.7	276		34.8
DZ-5	J19YD5	5/18/2010	9.92		1.97	1110		78.8	0.236	U	0.24	722		4.73	0.175	B	0.79	212		39.4
DZ-6	J19YD6	5/18/2010	9.93		1.78	844		71.3	0.214	U	0.21	634		4.28	0.713	U	0.71	214		35.6
DZ-7	J19YD7	5/18/2010	10.4		1.98	985		79.4	0.238	U	0.24	1190		4.76	0.794	U	0.79	247		39.7
DZ-8	J19YD8	5/18/2010	8.37		2.42	821		96.7	0.29	U	0.29	552		5.8	0.967	U	0.97	210		48.3
DZ-9	J19YD9	5/18/2010	13.7		2.18	731		87	0.261	U	0.26	507		5.22	0.87	U	0.87	221		43.5
DZ-10	J19YF0	5/18/2010	7.11		1.87	735		74.8	0.225	U	0.23	434		4.49	0.748	U	0.75	224		37.4
DZ-11	J19YF1	5/18/2010	9.14		2.1	892		84.2	0.253	U	0.25	565		5.05	0.842	U	0.84	245		42.1
DZ-12	J19YF2	5/18/2010	9.58		1.95	840		78	0.234	U	0.23	394		4.68	0.78	U	0.78	233		39
SPA-8	J19YJ4	5/17/2010	9.91		1.66	1410		66.3	0.199	U	0.2	433		3.98	0.145	B	0.66	183		33.2
Duplicate of SPA-8	J19YJ9	5/17/2010	10.2		2.03	1510		81.3	0.244	U	0.24	637		4.88	0.813	U	0.81	191		40.6
SPA-1	J19YH7	5/17/2010	9.52		2.12	748		85	0.255	U	0.26	362		5.1	0.85	U	0.85	173		42.5
SPA-2	J19YH8	5/17/2010	10.7		1.79	1800		71.7	0.215	U	0.22	617		4.3	0.717	U	0.72	200		35.9
SPA-3	J19YH9	5/17/2010	10.9		2.03	1980		81.1	0.243	U	0.24	753		4.87	0.811	U	0.81	203		40.6
SPA-4	J19YJ0	5/17/2010	10.2		1.61	1160		64.4	0.193	U	0.19	412		3.86	0.142	B	0.64	175		32.2
SPA-5	J19YJ1	5/17/2010	10.6		2.02	1760		81	0.243	U	0.24	493		4.86	0.81	U	0.81	179		40.5
SPA-6	J19YJ2	5/17/2010	9.26		1.94	1410		77.6	0.233	U	0.23	527		4.66	0.776	U	0.78	248		38.8
SPA-7	J19YJ3	5/17/2010	12		1.87	1200		74.8	0.224	U	0.22	535		4.49	0.748	U	0.75	220		37.4
SPA-9	J19YJ5	5/17/2010	11.2		1.57	1250		62.8	0.188	U	0.19	466		3.77	0.628	U	0.63	190		31.4
SPA-10	J19YJ6	5/17/2010	9.57		1.75	1190		69.9	0.21	U	0.21	442		4.19	0.145	B	0.7	190		34.9
SPA-11	J19YJ7	5/17/2010	10.4		1.75	1520		70.1	0.21	U	0.21	493		4.21	0.178	B	0.7	182		35.1
SPA-12	J19YJ8	5/17/2010	10.3		1.59	1720		63.6	0.191	U	0.19	457		3.82	0.157	B	0.64	191		31.8

Table B-2. 116-H-5 Deep Zone and Staging Pile Area Inorganic Data Results. (5 Pages)

Sample Location	HEIS Number	Sample Date	Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL
DZ-1	J19YD1	5/18/2010	41		0.74	32.6		2.21
Duplicate of DZ-1	J19YF3	5/18/2010	45.4		0.93	34.6		2.79
DZ-2	J19YD2	5/18/2010	59.1		1.03	38.7		3.1
DZ-3	J19YD3	5/18/2010	47.2		1.05	38.2		3.15
DZ-4	J19YD4	5/18/2010	47.2		0.7	36.7		2.09
DZ-5	J19YD5	5/18/2010	45.1		0.79	36.7		2.36
DZ-6	J19YD6	5/18/2010	44.3		0.71	33.4		2.14
DZ-7	J19YD7	5/18/2010	49.3		0.79	70.2		2.38
DZ-8	J19YD8	5/18/2010	43.3		0.97	34		2.9
DZ-9	J19YD9	5/18/2010	50.2		0.87	36.1		2.61
DZ-10	J19YF0	5/18/2010	48.4		0.75	38		2.25
DZ-11	J19YF1	5/18/2010	45.8		0.84	41.3		2.53
DZ-12	J19YF2	5/18/2010	44.1		0.78	48.8		2.34
SPA-8	J19YJ4	5/17/2010	44.8		0.66	40		1.99
Duplicate of SPA-8	J19YJ9	5/17/2010	46.1		0.81	41.7		2.44
SPA-1	J19YH7	5/17/2010	40.9		0.85	34		2.55
SPA-2	J19YH8	5/17/2010	47		0.72	38.8		2.15
SPA-3	J19YH9	5/17/2010	46.3		0.81	39.9		2.43
SPA-4	J19YJ0	5/17/2010	43.4		0.64	32.5		1.93
SPA-5	J19YJ1	5/17/2010	41.1		0.81	37.9		2.43
SPA-6	J19YJ2	5/17/2010	44.5		0.78	45		2.33
SPA-7	J19YJ3	5/17/2010	43.7		0.75	37.9		2.24
SPA-9	J19YJ5	5/17/2010	43.2		0.63	41.6		1.88
SPA-10	J19YJ6	5/17/2010	39.1		0.7	38		2.1
SPA-11	J19YJ7	5/17/2010	45.3		0.7	42		2.1
SPA-12	J19YJ8	5/17/2010	45		0.64	41.2		1.91

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YD1 DZ-1 5/18/2010			J19YD2 DZ-2 5/18/2010			J19YD3 DZ-3 5/18/2010			J19YD4 DZ-4 5/18/2010			J19YD5 DZ-5 5/18/2010			J19YD6 DZ-6 5/18/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Acenaphthene	10.1		3.48	3.51	U	3.51	3.56	U	3.56	6.88		3.52	5.98		3.52	3.51	U	3.51
Acenaphthylene	3.48	U	3.48	3.51	U	3.51	3.56	U	3.56	3.52	U	3.52	3.52	U	3.52	3.51	U	3.51
Anthracene	3.48	U	3.48	3.51	U	3.51	0.891	J	3.56	1.41	J	3.52	3.52	U	3.52	12.8		3.51
Benzo(a)anthracene	5.76		3.48	3.69		3.51	21.2		3.56	14.5		3.52	5.46		3.52	69.1		3.51
Benzo(a)pyrene	5.93		3.48	2.46	J	3.51	17.8		3.56	15.7		3.52	5.1		3.52	61.7		3.51
Benzo(b)fluoranthene	8.89		3.48	3.86		3.51	33.7		3.56	25.8		3.52	6.51		3.52	88.4		3.51
Benzo(ghi)perylene	5.23		3.48	2.28	J	3.51	13.9		3.56	13.2		3.52	4.58		3.52	41.1		3.51
Benzo(k)fluoranthene	2.79	J	3.48	1.41	J	3.51	11.4		3.56	8.82		3.52	2.46	J	3.52	33.2		3.51
Chrysene	9.42		3.48	5.62		3.51	21.6		3.56	35.1		3.52	4.58		3.52	65		3.51
Dibenz[a,h]anthracene	3.48	U	3.48	3.51	U	3.51	2.5	J	3.56	2.65	J	3.52	3.52	U	3.52	9.49		3.51
Fluoranthene	14.1		3.48	9.13		3.51	42.8		3.56	40		3.52	18		3.52	211		3.51
Fluorene	3.48	U	3.48	3.51	U	3.51	3.56	U	3.56	2.12	J	3.52	3.52	U	3.52	5.27		3.51
Indeno(1,2,3-cd)pyrene	3.48	U	3.48	2.28	J	3.51	14.3		3.56	12.5		3.52	3.34	J	3.52	46.1		3.51
Naphthalene	3.48	U	3.48	3.51	U	3.51	3.56	U	3.56	3.52	U	3.52	3.52	U	3.52	3.51	U	3.51
Phenanthrene	5.58		3.48	3.16	J	3.51	6.77		3.56	9.17		3.52	6.51		3.52	50.5		3.51
Pyrene	12.9		3.48	7.2		3.51	46.7		3.56	34.2		3.52	12.3		3.52	194		3.51
Aroclor-1016	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1221	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1232	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1242	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1248	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1254	13.7	U	13.7	13.1	U	13.1	13.9	U	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aroclor-1260	13.7	U	13.7	13.1	U	13.1	7.31	J	13.9	13.8	U	13.8	13.3	U	13.3	13.9	U	13.9
Aldrin	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Alpha-BHC	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
alpha-Chlordane	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
beta-1,2,3,4,5,6-Hexachlorocyclohexane	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Delta-BHC	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Dichlorodiphenyldichloroethane	1.37	UD	1.37	1.31	UD	1.31	2.12	JD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Dichlorodiphenyldichloroethylene	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Dichlorodiphenyltrichloroethane	1.37	UD	1.37	1.31	UD	1.31	3.1	JD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Dieldrin	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endosulfan I	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endosulfan II	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endosulfan sulfate	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endrin	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endrin aldehyde	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Endrin ketone	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Gamma-BHC (Lindane)	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
gamma-Chlordane	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Heptachlor	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Heptachlor epoxide	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Methoxychlor	1.37	UD	1.37	1.31	UD	1.31	1.39	UD	1.39	1.39	UD	1.39	1.33	UD	1.33	1.4	UD	1.4
Toxaphene	20.6	UD	20.6	19.6	UD	19.6	20.9	UD	20.9	20.8	UD	20.8	20	UD	20	21	UD	21
1,2,4-Trichlorobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
1,2-Dichlorobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
1,3-Dichlorobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
1,4-Dichlorobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,4,5-Trichlorophenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,4,6-Trichlorophenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,4-Dichlorophenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,4-Dimethylphenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,4-Dinitrophenol	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
2,4-Dinitrotoluene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2,6-Dinitrotoluene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2-Chloronaphthalene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2-Chlorophenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YD1 DZ-1 5/18/2010			J19YD2 DZ-2 5/18/2010			J19YD3 DZ-3 5/18/2010			J19YD4 DZ-4 5/18/2010			J19YD5 DZ-5 5/18/2010			J19YD6 DZ-6 5/18/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
2-Methylnaphthalene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2-Methylphenol (cresol, o-)	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
2-Nitroaniline	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
2-Nitrophenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
3+4 Methylphenol (cresol, m+p)	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
3,3'-Dichlorobenzidine	665	U	665	693	U	693	691	U	691	693	U	693	687	U	687	662	U	662
3-Nitroaniline	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
4,6-Dinitro-2-methylphenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
4-Bromophenylphenyl ether	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
4-Chloro-3-methylphenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
4-Chloroaniline	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
4-Chlorophenylphenyl ether	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
4-Nitroaniline	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
4-Nitrophenol	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
Acenaphthene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Acenaphthylene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Anthracene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	92.2	J	331
Benzo(a)anthracene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	212	J	331
Benzo(a)pyrene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	164	J	331
Benzo(b)fluoranthene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	152	J	331
Benzo(ghi)perylene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	119	J	331
Benzo(k)fluoranthene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	158	J	331
Bis(2-chloro-1-methylethyl)ether	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Bis(2-Chloroethoxy)methane	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Bis(2-chloroethyl) ether	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Bis(2-ethylhexyl) phthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Butylbenzylphthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Carbazole	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Chrysene	333	U	333	347	U	347	53.9	J	346	346	U	346	343	U	343	219	J	331
Di-n-butylphthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Di-n-octylphthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Dibenz[a,h]anthracene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Dibenzofuran	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Diethyl phthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Dimethyl phthalate	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Fluoranthene	333	U	333	347	U	347	85.7	J	85.7	58.1	J	346	343	U	343	543		331
Fluorene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Hexachlorobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Hexachlorobutadiene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Hexachlorocyclopentadiene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Hexachloroethane	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Indeno(1,2,3-cd)pyrene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	102	J	331
Isophorone	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
N-Nitroso-di-n-dipropylamine	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
N-Nitrosodiphenylamine	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Naphthalene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Nitrobenzene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Pentachlorophenol	1660	U	1660	1730	U	1730	1730	U	1730	1730	U	1730	1720	U	1720	1660	U	1660
Phenanthrene	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	408		331
Phenol	333	U	333	347	U	347	346	U	346	346	U	346	343	U	343	331	U	331
Pyrene	333	U	333	347	U	347	85.4	J	346	52.9	J	346	343	U	343	335		331

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YD7 DZ-7 5/18/2010			J19YD8 DZ-8 5/18/2010			J19YD9 DZ-9 5/18/2010			J19YF0 DZ-10 5/18/2010			J19YF1 DZ-11 5/18/2010			J19YF2 DZ-12 5/18/2010			J19YF3 Duplicate of 5/18/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Acenaphthene	14.2	UD	14.2	37.1		3.54	3.48	U	3.48	3.49	U	3.49	7.77		3.38	3.4	U	3.4	3.33	U	3.33
Acenaphthylene	41.7	D	14.2	3.54	U	3.54	3.48	U	3.48	3.49	U	3.49	3.38	U	3.38	3.4	U	3.4	3.33	U	3.33
Anthracene	16.1	D	14.2	2.84	J	3.54	3.83		3.48	1.75	J	3.49	9.29		3.38	15.2		3.4	1.33	J	3.33
Benzo(a)anthracene	592	D	14.2	22.3		3.54	16.7		3.48	14.1		3.49	48.7		3.38	94		3.4	18.3		3.33
Benzo(a)pyrene	533	D	14.2	22.5		3.54	14.3		3.48	14.3		3.49	68.9		3.38	142		3.4	15.2		3.33
Benzo(b)fluoranthene	974	D	14.2	32.4		3.54	19		3.48	19.6		3.49	69.1		3.38	107		3.4	12.2		3.33
Benzo(ghi)perylene	488	D	14.2	19.5		3.54	10.1		3.48	10.1		3.49	3.38	U	3.38	3.4	U	3.4	8.33		3.33
Benzo(k)fluoranthene	350	D	14.2	11.5		3.54	7.49		3.48	6.99		3.49	27.4		3.38	57.2		3.4	6		3.33
Chrysene	602	D	14.2	27.7		3.54	18.5		3.48	15.2		3.49	32.6		3.38	51.1		3.4	26.3		3.33
Dibenz[a,h]anthracene	86.3	D	14.2	3.72		3.54	2.26	J	3.48	2.27	J	3.49	3.38	U	3.38	3.4	U	3.4	1.17	J	3.33
Fluoranthene	1140	D	14.2	47.3		3.54	6.09		3.48	39.8		3.49	112		3.38	177		3.4	40.5		3.33
Fluorene	14.2	UD	14.2	2.13	J	3.54	1.57	J	3.48	1.22	J	3.49	5.41		3.38	8.01		3.4	1.17	J	3.33
Indeno(1,2,3-cd)pyrene	460	D	14.2	18.1		3.54	10.8		3.48	11		3.49	3.38	U	3.38	3.4	U	3.4	9.33		3.33
Naphthalene	14.2	UD	14.2	3.54	U	3.54	3.48	U	3.48	3.49	U	3.49	3.38	U	3.38	3.4	U	3.4	3.33	U	3.33
Phenanthrene	79.1	D	14.2	12.8		3.54	14.1		3.48	1.75	J	3.49	40.7		3.38	55.9		3.4	14.7		3.33
Pyrene	1360	D	14.2	48.8		3.54	42.8		3.48	36.2		3.49	125		3.38	155		3.4	36		3.33
Aroclor-1016	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1221	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1232	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1242	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1248	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1254	13.8	U	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aroclor-1260	6.28	J	13.8	14	U	14	13.4	U	13.4	13.8	U	13.8	14.1	U	14.1	13.7	U	13.7	13.8	U	13.8
Aldrin	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Alpha-BHC	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
alpha-Chlordane	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
beta-1,2,3,4,5,6-Hexachlorocyclohexane	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Delta-BHC	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Dichlorodiphenyldichloroethane	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Dichlorodiphenyldichloroethylene	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Dichlorodiphenyltrichloroethane	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Dieldrin	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endosulfan I	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endosulfan II	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endosulfan sulfate	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endrin	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endrin aldehyde	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Endrin ketone	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Gamma-BHC (Lindane)	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
gamma-Chlordane	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Heptachlor	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Heptachlor epoxide	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Methoxychlor	1.38	UD	1.38	1.4	UD	1.4	1.34	UD	1.34	1.39	UD	1.39	1.41	UD	1.41	1.37	UD	1.37	1.39	UD	1.39
Toxaphene	20.7	UD	20.7	21.1	UD	21.1	20.1	UD	20.1	20.8	UD	20.8	21.2	UD	21.2	20.6	UD	20.6	20.8	UD	20.8
1,2,4-Trichlorobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
1,2-Dichlorobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
1,3-Dichlorobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
1,4-Dichlorobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,4,5-Trichlorophenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,4,6-Trichlorophenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,4-Dichlorophenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,4-Dimethylphenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,4-Dinitrophenol	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
2,4-Dinitrotoluene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2,6-Dinitrotoluene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2-Chloronaphthalene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2-Chlorophenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YD7 DZ-7 5/18/2010			J19YD8 DZ-8 5/18/2010			J19YD9 DZ-9 5/18/2010			J19YF0 DZ-10 5/18/2010			J19YF1 DZ-11 5/18/2010			J19YF2 DZ-12 5/18/2010			J19YF3 Duplicate of 5/18/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
2-Methylnaphthalene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2-Methylphenol (cresol, o-)	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
2-Nitroaniline	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
2-Nitrophenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
3+4 Methylphenol (cresol, m+p)	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
3,3'-Dichlorobenzidine	689	U	689	698	U	698	670	U	670	687	U	687	700	U	700	679	U	679	687	U	687
3-Nitroaniline	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
4,6-Dinitro-2-methylphenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
4-Bromophenylphenyl ether	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
4-Chloro-3-methylphenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
4-Chloroaniline	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
4-Chlorophenylphenyl ether	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
4-Nitroaniline	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
4-Nitrophenol	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
Acenaphthene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Acenaphthylene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Anthracene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Benzo(a)anthracene	682		344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Benzo(a)pyrene	515		344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Benzo(b)fluoranthene	666		344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Benzo(ghi)perylene	481		344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Benzo(k)fluoranthene	566		344	349	U	349	335	U	335	343	U	343	350	U	350	55.4	J	340	343	U	343
Bis(2-chloro-1-methylethyl)ether	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Bis(2-Chloroethoxy)methane	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Bis(2-chloroethyl) ether	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Bis(2-ethylhexyl) phthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Butylbenzylphthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Carbazole	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Chrysene	724		344	349	U	349	335	U	335	343	U	343	350	U	350	54.1	J	340	343	U	343
Di-n-butylphthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Di-n-octylphthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Dibenz[a,h]anthracene	134	J	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Dibenzofuran	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Diethyl phthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Dimethyl phthalate	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Fluoranthene	954		344	349	U	349	335	U	335	343	U	343	350	U	350	78.6	J	340	343	U	343
Fluorene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Hexachlorobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Hexachlorobutadiene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Hexachlorocyclopentadiene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Hexachloroethane	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Indeno(1,2,3-cd)pyrene	397		344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Isophorone	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
N-Nitroso-di-n-dipropylamine	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
N-Nitrosodiphenylamine	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Naphthalene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Nitrobenzene	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Pentachlorophenol	1720	U	1720	1740	U	1740	1680	U	1680	1720	U	1720	1750	U	1750	1700	U	1700	1720	U	1720
Phenanthrene	78.4	J	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Phenol	344	U	344	349	U	349	335	U	335	343	U	343	350	U	350	340	U	340	343	U	343
Pyrene	868		344	349	U	349	335	U	335	343	U	343	350	U	350	78.1	J	340	343	U	343

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YH7 SPA-1 5/17/2010			J19YH8 SPA-2 5/17/2010			J19YH9 SPA-3 5/17/2010			J19YJ0 SPA-4 5/17/2010			J19YJ1 SPA-5 5/17/2010			J19YJ2 SPA-6 5/17/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Acenaphthene	6.67	U	6.67	3.33	U	3.33	3.29	U	3.29	3.34	U	3.34	6.77		3.3	13.2	U	13.2
Acenaphthylene	6.67	U	6.67	34.9		3.33	3.29	U	3.29	16.7		3.34	85.1		3.3	53.3	D	13.2
Anthracene	71.7	D	6.67	3.33	U	3.33	1.7	J	3.29	3.34	U	3.34	3.3	U	3.3	62.3	D	13.2
Benzo(a)anthracene	258	D	6.67	7.26		3.33	4.56		3.29	1.04	J	3.34	14.5		3.3	334	D	13.2
Benzo(a)pyrene	307	D	6.67	10.5		3.33	5.52		3.29	2.07	J	3.34	10.4		3.3	380	D	13.2
Benzo(b)fluoranthene	338	D	6.67	11.2		3.33	4.51		3.29	1.81	J	3.34	7.95		3.3	366	D	13.2
Benzo(ghi)perylene	186	D	6.67	12.2		3.33	4.04		3.29	1.15	J	3.34	30.9		3.3	242	D	13.2
Benzo(k)fluoranthene	145	D	6.67	6.28		3.33	2.42	J	3.29	1	J	3.34	4.23		3.3	183	D	13.2
Chrysene	143	D	6.67	4.05		3.33	4.91		3.29	3.34	U	3.34	17.8		3.3	339	D	13.2
Dibenz[a,h]anthracene	39.9	D	6.67	1.5	J	3.33	3.29	U	3.29	3.34	U	3.34	9.3		3.3	49.8	D	13.2
Fluoranthene	731	D	6.67	29.7		3.33	17.7		3.29	6.67		3.34	33.5		3.3	905	D	13.2
Fluorene	32.9	D	6.67	3.33	U	3.33	3.29	U	3.29	3.34	U	3.34	3.3	U	3.3	32.2	D	13.2
Indeno(1,2,3-cd)pyrene	211	D	6.67	11.6		3.33	3.99		3.29	1.6	J	3.34	11.2		3.3	252	D	13.2
Naphthalene	6.67	U	6.67	3.33	U	3.33	3.29	U	3.29	3.34	U	3.34	3.3	U	3.3	13.2	U	13.2
Phenanthrene	247	D	6.67	10.6		3.33	5.73		3.29	1.96	J	3.34	12.1		3.3	326	D	13.2
Pyrene	790	D	6.67	22		3.33	10.6		3.29	1.49	J	3.34	24.2		3.3	956	D	13.2
Aroclor-1016	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.4	U	13.4
Aroclor-1221	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.4	U	13.4
Aroclor-1232	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.4	U	13.4
Aroclor-1242	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.4	U	13.4
Aroclor-1248	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.4	U	13.4
Aroclor-1254	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	20.8		13.4
Aroclor-1260	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	24.8		13.4
Aldrin	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Alpha-BHC	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
alpha-Chlordane	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Delta-BHC	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Dichlorodiphenyldichloroethane	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Dichlorodiphenyldichloroethylene	1.51	JD	1.51	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	268	D	268
Dichlorodiphenyltrichloroethane	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	17.5	D	17.5
Dieldrin	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endosulfan I	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endosulfan II	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endosulfan sulfate	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endrin	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endrin aldehyde	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Endrin ketone	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Gamma-BHC (Lindane)	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
gamma-Chlordane	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Heptachlor	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Heptachlor epoxide	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Methoxychlor	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.34	UD	1.34	1.34	UD	1.34
Toxaphene	20.1	UD	20.1	19.9	UD	19.9	20.1	UD	20.1	20	UD	20	20.1	UD	20.1	20.1	UD	20.1
1,2,4-Trichlorobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
1,2-Dichlorobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
1,3-Dichlorobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
1,4-Dichlorobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,4,5-Trichlorophenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,4,6-Trichlorophenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,4-Dichlorophenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,4-Dimethylphenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,4-Dinitrophenol	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
2,4-Dinitrotoluene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2,6-Dinitrotoluene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2-Chloronaphthalene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2-Chlorophenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YH7 SPA-1 5/17/2010			J19YH8 SPA-2 5/17/2010			J19YH9 SPA-3 5/17/2010			J19YJ0 SPA-4 5/17/2010			J19YJ1 SPA-5 5/17/2010			J19YJ2 SPA-6 5/17/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
2-Methylnaphthalene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2-Methylphenol (cresol, o-)	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
2-Nitroaniline	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
2-Nitrophenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
3+4 Methylphenol (cresol, m+p)	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
3,3'-Dichlorobenzidine	655	U	655	662	U	662	664	U	664	650	U	650	662	U	662	651	U	651
3-Nitroaniline	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
4,6-Dinitro-2-methylphenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
4-Bromophenylphenyl ether	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
4-Chloro-3-methylphenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
4-Chloroaniline	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
4-Chlorophenylphenyl ether	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
4-Nitroaniline	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
4-Nitrophenol	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
Acenaphthene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Acenaphthylene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Anthracene	89.6	J	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Benzo(a)anthracene	435		327	331	U	331	332	U	332	325	U	325	331	U	331	179	J	326
Benzo(a)pyrene	400		327	331	U	331	332	U	332	325	U	325	331	U	331	176	J	326
Benzo(b)fluoranthene	369		327	331	U	331	332	U	332	325	U	325	331	U	331	172	J	326
Benzo(ghi)perylene	237	J	327	331	U	331	332	U	332	325	U	325	331	U	331	77.4	J	326
Benzo(k)fluoranthene	382		327	331	U	331	332	U	332	325	U	325	331	U	331	180	J	326
Bis(2-chloro-1-methylethyl)ether	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Bis(2-Chloroethoxy)methane	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Bis(2-chloroethyl) ether	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Bis(2-ethylhexyl) phthalate	327	U	327	273	J	331	332	U	332	325	U	325	331	U	331	326	U	326
Butylbenzylphthalate	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Carbazole	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Chrysene	441		327	331	U	331	332	U	332	325	U	325	331	U	331	194	J	326
Di-n-butylphthalate	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Di-n-octylphthalate	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Dibenz[a,h]anthracene	96.2	J	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Dibenzofuran	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Diethyl phthalate	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Dimethyl phthalate	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Fluoranthene	816		327	331	U	331	332	U	332	325	U	325	331	U	331	366		326
Fluorene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Hexachlorobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Hexachlorobutadiene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Hexachlorocyclopentadiene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Hexachloroethane	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Indeno(1,2,3-cd)pyrene	243	J	327	331	U	331	332	U	332	325	U	325	331	U	331	83.1	J	326
Isophorone	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
N-Nitroso-di-n-dipropylamine	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
N-Nitrosodiphenylamine	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Naphthalene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Nitrobenzene	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Pentachlorophenol	1640	U	1640	1650	U	1650	1660	U	1660	1630	U	1630	1650	U	1650	1630	U	1630
Phenanthrene	318	J	327	331	U	331	332	U	332	325	U	325	331	U	331	171	J	326
Phenol	327	U	327	331	U	331	332	U	332	325	U	325	331	U	331	326	U	326
Pyrene	637		327	331	U	331	332	U	332	325	U	325	331	U	331	309	J	326

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YJ3 SPA-7 5/17/2010			J19YJ4 SPA-8 5/17/2010			J19YJ5 SPA-9 5/17/2010			J19YJ6 SPA-10 5/17/2010			J19YJ7 SPA-11 5/17/2010			J19YJ8 SPA-12 5/17/2010			J19YJ9 Duplicate of 5/17/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Acenaphthene	3.31	U	3.31	47.7		3.31	3.34	U	3.34	3.34	U	3.34	3.29	U	3.29	3.34	U	3.34	39.1		3.35
Acenaphthylene	3.31	U	3.31	3.31	U	3.31	3.34	U	3.34	3.34	U	3.34	13		3.29	3.34	U	3.34	3.35	U	3.35
Anthracene	6.24		3.31	29.7		3.31	4.66		3.34	4.65		3.34	6.44		3.29	4.89		3.34	28.4		3.35
Benzo(a)anthracene	40		3.31	141		3.31	61.2		3.34	68.6		3.34	57.5		3.29	47.8		3.34	128		3.35
Benzo(a)pyrene	41.9		3.31	117		3.31	64.5		3.34	75.1		3.34	72.4		3.29	52.4		3.34	142		3.35
Benzo(b)fluoranthene	55.2		3.31	148		3.31	81.8		3.34	98.4		3.34	91.8		3.29	67.8		3.34	179		3.35
Benzo(ghi)perylene	26.7		3.31	74.8		3.31	46.2		3.34	54.7		3.34	50.6		3.29	61.3		3.34	90.1		3.35
Benzo(k)fluoranthene	19		3.31	56.8		3.31	30		3.34	37.2		3.34	32.9		3.29	25.1		3.34	67		3.35
Chrysene	39		3.31	235		3.31	101		3.34	107		3.34	67.6		3.29	70.2		3.34	117		3.35
Dibenz[a,h]anthracene	4.74		3.31	14.3		3.31	8.71		3.34	10.6		3.34	8.93		3.29	8.69		3.34	19.2		3.35
Fluoranthene	133		3.31	297		3.31	149		3.34	220		3.34	171		3.29	139		3.34	333		3.35
Fluorene	2.85	J	3.31	14		3.31	2.89	J	3.34	7.59		3.34	3.05	J	3.29	2.49	J	3.34	11.9		3.35
Indeno(1,2,3-cd)pyrene	29		3.31	85.5		3.31	46.8		3.34	54.5		3.34	52.7		3.29	56.8		3.34	95.6		3.35
Naphthalene	3.31	U	3.31	3.31	U	3.31	16.4		3.34	7.54		3.34	13.7		3.29	3.34	U	3.34	3.35	U	3.35
Phenanthrene	47.6		3.31	143		3.31	41.7		3.34	65.9		3.34	51.1		3.29	52		3.34	128		3.35
Pyrene	104		3.31	299		3.31	148		3.34	185		3.34	158		3.29	123		3.34	346		3.35
Aroclor-1016	13.4	U	13.4	13.4	U	13.4	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1221	13.4	U	13.4	13.4	U	13.4	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1232	13.4	U	13.4	13.4	U	13.4	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1242	13.4	U	13.4	13.4	U	13.4	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1248	13.4	U	13.4	13.4	U	13.4	13.4	U	13.4	13.3	U	13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1254	13.4	U	13.4	13.4	U	13.4	13	J	13.4	16.4		13.3	13.4	U	13.4	13.2	U	13.2	13.4	U	13.4
Aroclor-1260	4.45	J	13.4	5.35	J	13.4	11.7	J	13.4	16.8		13.3	5.37	J	13.4	13.2	U	13.2	5.26	J	13.4
Aldrin	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Alpha-BHC	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
alpha-Chlordane	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
beta-1,2,3,4,5,6-Hexachlorocyclohexane	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Delta-BHC	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Dichlorodiphenyldichloroethane	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Dichlorodiphenyldichloroethylene	1.37	JD	1.37	5.86	JD	5.86	24.7	D	24.7	10.3	D	10.3	4.87	JD	4.87	2.08	JD	2.08	6.74	D	6.74
Dichlorodiphenyltrichloroethane	1.34	UD	1.34	1.34	UD	1.34	2.54	JD	2.54	1.84	JD	1.84	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Dieldrin	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Endosulfan I	1.34	UD	1.34	1.35	JD	1.35	1.34	UD	1.34	4.68	JD	4.68	1.34	UD	1.34	1.32	UD	1.32	3.02	JD	3.02
Endosulfan II	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Endosulfan sulfate	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Endrin	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Endrin aldehyde	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Endrin ketone	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Gamma-BHC (Lindane)	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
gamma-Chlordane	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Heptachlor	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Heptachlor epoxide	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Methoxychlor	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.34	UD	1.34	1.32	UD	1.32	1.34	UD	1.34
Toxaphene	20.1	UD	20.1	20.2	UD	20.2	20.1	UD	20.1	20.1	UD	20.1	20.1	UD	20.1	19.8	UD	19.8	20.1	UD	20.1
1,2,4-Trichlorobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
1,2-Dichlorobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
1,3-Dichlorobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
1,4-Dichlorobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,4,5-Trichlorophenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,4,6-Trichlorophenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,4-Dichlorophenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,4-Dimethylphenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,4-Dinitrophenol	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
2,4-Dinitrotoluene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2,6-Dinitrotoluene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2-Chloronaphthalene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2-Chlorophenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658

Table B-3. 116-H-5 Deep Zone and Organics Data Results. (8 Pages)

Constituent	J19YJ3 SPA-7 5/17/2010			J19YJ4 SPA-8 5/17/2010			J19YJ5 SPA-9 5/17/2010			J19YJ6 SPA-10			J19YJ7 SPA-11 5/17/2010			J19YJ8 SPA-12 5/17/2010			J19YJ9 Duplicate of 5/17/2010		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
2-Methylnaphthalene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2-Methylphenol (cresol, o-)	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
2-Nitroaniline	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
2-Nitrophenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
3+4 Methylphenol (cresol, m+p)	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
3,3'-Dichlorobenzidine	663	U	663	663	U	663	661	U	661	660	U	660	660	U	660	663	U	663	1320	UD	1320
3-Nitroaniline	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
4,6-Dinitro-2-methylphenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
4-Bromophenylphenyl ether	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
4-Chloro-3-methylphenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
4-Chloroaniline	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
4-Chlorophenylphenyl ether	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
4-Nitroaniline	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
4-Nitrophenol	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
Acenaphthene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	231	JD	658
Acenaphthylene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Anthracene	331	U	331	331	U	331	59.8	J	330	330	U	330	330	U	330	332	U	332	501	JD	658
Benzo(a)anthracene	70.2	J	331	91.6	J	331	283	J	330	84.4	J	330	121	J	330	117	J	332	1450	D	658
Benzo(a)pyrene	66.9	J	331	90.1	J	331	268	J	330	96.3	J	330	123	J	330	108	J	332	1310	D	658
Benzo(b)fluoranthene	62.7	J	331	88.5	J	331	260	J	330	97.3	J	330	119	J	330	102	J	332	1190	D	658
Benzo(ghi)perylene	331	U	331	331	U	331	115	J	330	330	U	330	54.7	J	330	117	J	332	906	D	658
Benzo(k)fluoranthene	65.8	J	331	91.5	J	331	269	J	330	93.6	J	330	117	J	330	90.8	J	332	1240	D	658
Bis(2-chloro-1-methylethyl)ether	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Bis(2-Chloroethoxy)methane	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Bis(2-chloroethyl) ether	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Bis(2-ethylhexyl) phthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Butylbenzylphthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Carbazole	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	267	JD	658
Chrysene	77.9	J	331	96.8	J	331	287	J	330	101	J	330	128	J	330	117	J	332	1440	D	658
Di-n-butylphthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Di-n-octylphthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Dibenz[a,h]anthracene	331	U	331	331	U	331	66.2	J	330	330	U	330	330	U	330	332	U	332	313	JD	658
Dibenzofuran	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	112	JD	658
Diethyl phthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Dimethyl phthalate	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Fluoranthene	138	J	331	181	J	331	564		330	179	J	330	238	J	330	223	J	332	3120	D	658
Fluorene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	177	JD	658
Hexachlorobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Hexachlorobutadiene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Hexachlorocyclopentadiene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Hexachloroethane	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Indeno(1,2,3-cd)pyrene	331	U	331	331	U	331	129	J	330	330	U	330	59.4	J	330	90.8	J	332	805	D	658
Isophorone	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
N-Nitroso-di-n-dipropylamine	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
N-Nitrosodiphenylamine	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Naphthalene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Nitrobenzene	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Pentachlorophenol	1660	U	1660	1660	U	1660	1650	U	1650	1650	U	1650	1650	U	1650	1660	U	1660	3290	UD	3290
Phenanthrene	64.2	J	331	105	J	331	240	J	330	73.4	J	330	104	J	330	111	J	332	2110	D	658
Phenol	331	U	331	331	U	331	330	U	330	330	U	330	330	U	330	332	U	332	658	UD	658
Pyrene	118	J	331	154	J	331	421		330	151	J	330	194	J	330	172	J	332	2190	D	658

APPENDIX C

SITE-SPECIFIC RESRAD CALCULATION FOR TECHNETIUM-99

APPENDIX C

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 files will be stored in a U.S. Department of Energy, Richland Operations Office, repository. These calculations have been prepared in accordance with ENG-1, *Engineering Services*, ENG-1-4.5, "Project Calculation," Washington Closure Hanford, Richland, Washington. The following calculations are provided in this appendix.

116-H-5 Modeling Calculation Brief for Groundwater and River Protection, 0100H-CA-V0163, Rev. 2, Washington Closure Hanford, Richland, Washington.

DISCLAIMER FOR CALCULATIONS

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

CALCULATION COVER SHEET

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

Area: 100-H

Discipline: Environmental *Calculation No: 0100H-CA-V0163

Subject: 116-H-5 Modeling Calculation Brief for Groundwater and River Protection

Computer Program: RESRAD Program No: Version 6.5

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 pg Summary – 5 pg Attm. 1 - 18 pg Attm. 2 - 10 pg Total – 34 pages	*(Signed)* S. W. Clark	*(Signed)* M. W. Perrott	*(Signed)* C. H. Dobie	*(Signed)* D. F. Obenauer	*(Approved)* 4/26/11
1	Cover – 1 pg Summary – 8 pg Attm. 1 - 18 pg Attm. 2 - 10 pg Total – 37 pages	*(Signed)* S. W. Clark	*(Signed)* M. W. Perrott	*(Signed)* C. H. Dobie	*(Signed)* S. W. Callison	*(Approved)* 11/8/11
2	Cover – 1 pg Summary – 3 pg Attm. 1 - 18 pg Attm. 2 - 10 pg Total – 32 pages	S. W. Clark	M. W. Perrott	C. H. Dobie	S. W. Callison	3-26-12

SUMMARY OF REVISION

1	Revision 1 was necessary to include calculations of soil screening level partitioning for migration to groundwater for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene as reported in the Remaining Sites Verification Package for 116-H-5. For convenience the calculation brief has been replaced in its entirety.
2	Revision 2 was necessary to remove calculations of migration to groundwater and the Columbia River for lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene. For convenience the calculation brief has been replaced in its entirety.

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

Washington Closure Hanford CALCULATION SHEET

Originator:	S. W. Clark	Date:	3/22/12	Calc. No.:	0100H-CA-V0163	Rev.:	1
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	M. W. Perrott	Date:	3/22/12
Subject:	116-H-5 RESRAD Calculation Brief for Groundwater and River Protection					Sheet No. 1 of 3	

PURPOSE:

Predict the groundwater concentrations over a period of 1,000 years based on technetium-99 analyses of soil collected from the excavation at the 116-H-5 cleanup verification sampling site.

GIVEN/REFERENCES:

1) Cleanup verification samples were collected from the excavation at the 116-H-5 waste site. Soil analyses of technetium-99 exceeded remedial action goals (RAGs) for protection of groundwater and were subsequently evaluated by site-specific RESidual RADioactivity (RESRAD) modeling as described in Appendix C of the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2009). Site-specific RESRAD evaluations were performed to predict the Tc-99 concentrations in groundwater due to Tc-99 in the soil as reported in Table 1.

SOLUTION:

1) As discussed in Sections 3.6.8 and 3.6.9 of the RDR/RAWP (DOE-RL 2009), the residual concentrations of radionuclides in the soil are compared to the soil RAGs for protection of groundwater as summarized in Table 2-1 of the RDR/RAWP. The groundwater protection RAGs are attained if the residual concentrations of radionuclides in soil are less than the RAGs in Table 2-1. If this is not the case, a more detailed assessment using RESRAD or other appropriate methods is used to assess the potential of residual site soil contaminants to impact groundwater. If this more detailed assessment indicates that the residual contamination in the site soils will not impact groundwater at concentrations above groundwater cleanup levels, then the groundwater protection RAGs have been attained.
2) A site-specific RESRAD evaluation was performed for the Tc-99 soil concentration where the soil RAG for groundwater protection was exceeded at the 116-H-5 sample locations. The areas of influence of the site-specific samples for purposes of the RESRAD evaluation are shown in Table 1, which also presents soil concentrations and other parameters used in the RESRAD calculations. Input factors for the RESRAD evaluation are also contained in the "Summary" section of the RESRAD "Mixture Sums and Single Radionuclide Guidelines" printout in Attachment 1 to this Calculation Summary. The year when the peak Tc-99 concentration is predicted to occur in groundwater from the waste site was determined by apreliminary RESRAD run. This year was then added for all horizons for the final RESRAD runs. For the water pathways, the peak year Tc-99 in groundwater is predicted to occur at year 0.5 for Tc-99.

Washington Closure Hanford CALCULATION SHEET

Originator:	S. W. Clark	Date:	3/22/12	Calc. No.:	0100H-CA-V0163	Rev.:	1
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	M. W. Perrott	Date:	3/22/12
Subject:	116-H-5 RESRAD Calculation Brief for Groundwater and River Protection					Sheet No. 2 of 3	

Table 1. Waste Site-Specific Parameters for RESRAD Modeling

Parameter	Units	Tc-99
Contaminant-Specific Input Parameters		
Tc-99 Concentration	pCi/g	0.8
Tc-99 Kd Value	mL/g	0
Contaminated Zone Dimensions		
Cover Depth	m	0
Area of Contaminated Zone (CZ)	m^2	124.6
Length Parallel to Aquifer Flow	m	12
Thickness of Vadose Zone Horizons		
Thickness: Contaminated Zone	m	11
Thickness: Unsaturated Zone	m	0

METHODOLOGY:

1) Using the methodology described in Appendix C of the RDR/RAWP (DOE-RL 2009), RESRAD modeling was used to determine if residual soil concentrations of Tc-99 are protective of groundwater. Runs of RESRAD version 6.5 (ANL 2009) were completed for the Tc-99 soil concentration where the groundwater protection RAGs were exceeded in the 116-H-5 waste site cleanup verification sampling activities. RESRAD numerical output reports of predicted Tc-99 concentrations in soil and groundwater are presented in Attachment 2 to this calculation summary.

RESULTS:

1) Groundwater Protection for Technetium-99

The Tc-99 concentrations in groundwater at different time intervals for up to 1,000 years were calculated by the RESRAD model. RESRAD output is presented in Attachment 2 and summarized in Table 2. Tc-99 is predicted to reach groundwater within the 1,000 years of the RESRAD model evaluation and is predicted to peak at year 0.5 for Tc-99 at the maximum groundwater concentration shown in Table 2 (197 pCi/L for Tc-99), which is less than the groundwater RAG of 900 pCi/L for Tc-99 from Table B-6 of Appendix B of the RDR/RAWP (DOE-RL 2009).

Table 2. Predicted Groundwater Concentrations of Technetium-99 at 116-H-5

Contaminant	Sample Number	Groundwater Concentrations in pCi/L at Each Time Interval (yr)								RAGs
		0	0.5	1	10	30	92	300	1000	
Tc-99	J1FKM8	0	197	193.5	138	65.1	6.35	0	0	900 pCi/L [b]

[a] Based on the maximum contaminant level (MCL) for Tc-99, as discussed in Appendix B and Table B-6, of the RDR/RAWP (DOE-RL 2009).

Washington Closure Hanford CALCULATION SHEET

Originator:	S. W. Clark	Date:	3/22/12	Calc. No.:	0100H-CA-V0163	Rev.:	1
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	M. W. Perrott	Date:	3/22/12
Subject:	116-H-5 RESRAD Calculation Brief for Groundwater and River Protection					Sheet No. 3 of 3	

CONCLUSIONS:

- Maximum Tc-99 concentrations in the soil at the 116-H-5 waste site are predicted to be protective of groundwater and the Columbia River for 1,000 years.

- Tc-99 concentrations in groundwater are predicted to peak at year 0.5 at a maximum concentration of 197 pCi/L. The predicted maximum groundwater concentration is less than the groundwater cleanup RAG of 900 pCi/L for Tc-99 from Table B-6 of Appendix B of the RDR/RAWP (DOE-RL 2009).

REFERENCES:

ANL, 2009, *RESRAD for Windows*, Version 6.5, Argonne National Laboratory, Environmental Assessment Division, Argonne, Illinois, < http://www.ead.anl.gov/resrad >.

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

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

ATTACHMENTS:

1. RESRAD Output: 116-H-5 Tc-99 Groundwater Protection – Mixture Sums and Single Radionuclide Guidelines (18 pages).
2. RESRAD Output: 116-H-5 Tc-99 Groundwater Protection – Concentration of Radionuclides, (10 pages).

ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   1
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

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Attachment 1 Sheet No. 1 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
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ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days       03/22/2012  14:35  Page   2
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Tc-99 (Source: FGR 12)	1.255E-04	1.255E-04	DCF1(1)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(1)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(1)
D-34	Food transfer factors:			
D-34	Tc-99 , plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(1,1)
D-34	Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(1,2)
D-34	Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(1,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(1,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(1,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Originator: S. W. Clark	Date 3/22/2012
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1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 3
Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.246E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.100E+01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.200E+01	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	5.000E-01	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	3.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)	1.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	3.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	9.200E+01	3.000E+02	---	T(7)
R011	Times for calculations (yr)	3.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.000E-01	0.000E+00	---	S1(1)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(1)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	1.500E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.500E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.400E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.100E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.600E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	7.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.500E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.500E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	5.530E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.250E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	4.600E+00	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW

Attachment 1 Sheet No. 3 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

ATTACHMENT 1

1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 4
Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Number of unsaturated zone strata	0	1	---	NS
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(1)
R016	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.751E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	8.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.000E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.100E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.700E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.000E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	3.600E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	1.970E+01	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)

Attachment 1 Sheet No. 4 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
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ATTACHMENT 1

1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 5
Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Soil ingestion rate (g/yr)	7.300E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	7.300E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.623E-01	FPLANT
R018	Contamination fraction of meat	-1	-1	0.623E-02	FMEAT
R018	Contamination fraction of milk	-1	-1	0.623E-02	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5

Attachment 1 Sheet No. 5 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
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ATTACHMENT 1

1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 6
Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	1	---	---	LYMAX
TITL	Maximum number of integration points for risk	5	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Attachment 1 Sheet No. 6 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days         03/22/2012  14:35  Page   7
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:     124.60 square meters              Tc-99     8.000E-01
   Thickness:      11.00 meters
 Cover Depth:       0.00 meters
0
                                          Total Dose TDOSE(t), mrem/yr
                                    Basic Radiation Dose Limit = 1.500E+01 mrem/yr
                   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
                   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  5.000E-01  1.000E+00  3.000E+00  1.000E+01  3.000E+01  9.200E+01  3.000E+02  1.000E+03
      TDOSE(t):  4.128E-02  2.587E-01  2.536E-01  2.352E-01  1.809E-01  8.535E-02  8.321E-03  3.375E-06  1.294E-17
         M(t):  2.752E-03  1.725E-02  1.691E-02  1.568E-02  1.206E-02  5.690E-03  5.547E-04  2.250E-07  8.628E-19
0Maximum TDOSE(t):  2.589E-01 mrem/yr    at t =  0.4918 ñ 0.0010 years
0
                         Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
                                         As mrem/yr and Fraction of Total Dose At t = 4.918E-01 years
0                                          Water Independent Pathways (Inhalation excludes radon)
0             Ground            Inhalation           Radon              Plant               Meat                Milk                Soil
Radio-  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
Nuclide  mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.
Nuclide
ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ
Tc-99    5.661E-05 0.0002  1.660E-07 0.0000  0.000E+00 0.0000  4.031E-02 0.1557  8.815E-06 0.0000  1.977E-04 0.0008  8.344E-06 0.0000
ííííííí ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí
Total    5.661E-05 0.0002  1.660E-07 0.0000  0.000E+00 0.0000  4.031E-02 0.1557  8.815E-06 0.0000  1.977E-04 0.0008  8.344E-06 0.0000
0
                         Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
                                         As mrem/yr and Fraction of Total Dose At t = 4.918E-01 years
0                                                       Water Dependent Pathways
0             Water               Fish              Radon              Plant               Meat                Milk           All Pathways*
Radio-  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
Nuclide  mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.   mrem/yr  fract.
Nuclide
ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ  ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄ
Tc-99    2.106E-01 0.8135  2.395E-04 0.0009  0.000E+00 0.0000  7.370E-03 0.0285  2.818E-06 0.0000  9.412E-05 0.0004  2.589E-01 1.0000
ííííííí ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí  ííííííííí íííííí
Total    2.106E-01 0.8135  2.395E-04 0.0009  0.000E+00 0.0000  7.370E-03 0.0285  2.818E-06 0.0000  9.412E-05 0.0004  2.589E-01 1.0000
0*Sum of all water independent and dependent pathways.
```

Attachment 1	Sheet No. 7 of 18
Originator: S. W. Clark	Date 3/22/2012
Chk'd By M. W. Perrott	Date 3/22/2012
Calc. No. 0100H-CA-V0163	Rev. No. 2

ATTACHMENT 1

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   8
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	5.766E-05	0.0014	1.691E-07	0.0000	0.000E+00	0.0000	4.100E-02	0.9933	8.920E-06	0.0002	2.005E-04	0.0049	8.499E-06	0.0002
Total	5.766E-05	0.0014	1.691E-07	0.0000	0.000E+00	0.0000	4.100E-02	0.9933	8.920E-06	0.0002	2.005E-04	0.0049	8.499E-06	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.128E-02	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.128E-02	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 1 Sheet No. 8 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

ATTACHMENT 1

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   9
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E-01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	5.659E-05	0.0002	1.660E-07	0.0000	0.000E+00	0.0000	4.030E-02	0.1558	8.813E-06	0.0000	1.977E-04	0.0008	8.341E-06	0.0000
Total	5.659E-05	0.0002	1.660E-07	0.0000	0.000E+00	0.0000	4.030E-02	0.1558	8.813E-06	0.0000	1.977E-04	0.0008	8.341E-06	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E-01 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	2.105E-01	0.8134	2.391E-04	0.0009	0.000E+00	0.0000	7.359E-03	0.0284	2.884E-06	0.0000	9.560E-05	0.0004	2.587E-01	1.0000
Total	2.105E-01	0.8134	2.391E-04	0.0009	0.000E+00	0.0000	7.359E-03	0.0284	2.884E-06	0.0000	9.560E-05	0.0004	2.587E-01	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	9 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  10
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	5.554E-05	0.0002	1.629E-07	0.0000	0.000E+00	0.0000	3.955E-02	0.1560	8.649E-06	0.0000	1.940E-04	0.0008	8.186E-06	0.0000
Total	5.554E-05	0.0002	1.629E-07	0.0000	0.000E+00	0.0000	3.955E-02	0.1560	8.649E-06	0.0000	1.940E-04	0.0008	8.186E-06	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	2.063E-01	0.8134	2.327E-04	0.0009	0.000E+00	0.0000	7.155E-03	0.0282	3.747E-06	0.0000	1.051E-04	0.0004	2.536E-01	1.0000
Total	2.063E-01	0.8134	2.327E-04	0.0009	0.000E+00	0.0000	7.155E-03	0.0282	3.747E-06	0.0000	1.051E-04	0.0004	2.536E-01	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	10 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  11
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	5.153E-05	0.0002	1.511E-07	0.0000	0.000E+00	0.0000	3.669E-02	0.1560	8.024E-06	0.0000	1.800E-04	0.0008	7.595E-06	0.0000
Total	5.153E-05	0.0002	1.511E-07	0.0000	0.000E+00	0.0000	3.669E-02	0.1560	8.024E-06	0.0000	1.800E-04	0.0008	7.595E-06	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	1.913E-01	0.8134	2.159E-04	0.0009	0.000E+00	0.0000	6.638E-03	0.0282	3.476E-06	0.0000	9.746E-05	0.0004	2.352E-01	1.0000
Total	1.913E-01	0.8134	2.159E-04	0.0009	0.000E+00	0.0000	6.638E-03	0.0282	3.476E-06	0.0000	9.746E-05	0.0004	2.352E-01	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	11 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  12
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	3.963E-05	0.0002	1.162E-07	0.0000	0.000E+00	0.0000	2.822E-02	0.1560	6.171E-06	0.0000	1.384E-04	0.0008	5.841E-06	0.0000
Total	3.963E-05	0.0002	1.162E-07	0.0000	0.000E+00	0.0000	2.822E-02	0.1560	6.171E-06	0.0000	1.384E-04	0.0008	5.841E-06	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	1.471E-01	0.8134	1.660E-04	0.0009	0.000E+00	0.0000	5.103E-03	0.0282	2.672E-06	0.0000	7.493E-05	0.0004	1.809E-01	1.0000
Total	1.471E-01	0.8134	1.660E-04	0.0009	0.000E+00	0.0000	5.103E-03	0.0282	2.672E-06	0.0000	7.493E-05	0.0004	1.809E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 1 Sheet No. 12 of 18
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  13
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	1.872E-05	0.0002	5.489E-08	0.0000	0.000E+00	0.0000	1.333E-02	0.1561	2.914E-06	0.0000	6.537E-05	0.0008	2.759E-06	0.0000
Total	1.872E-05	0.0002	5.489E-08	0.0000	0.000E+00	0.0000	1.333E-02	0.1561	2.914E-06	0.0000	6.537E-05	0.0008	2.759E-06	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	6.941E-02	0.8132	7.832E-05	0.0009	0.000E+00	0.0000	2.408E-03	0.0282	1.261E-06	0.0000	3.536E-05	0.0004	8.535E-02	1.0000
Total	6.941E-02	0.8132	7.832E-05	0.0009	0.000E+00	0.0000	2.408E-03	0.0282	1.261E-06	0.0000	3.536E-05	0.0004	8.535E-02	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	13 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  14
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 9.200E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Tc-99	1.829E-06	0.0002	5.364E-09	0.0000	0.000E+00	0.0000	1.302E-03	0.1565	2.848E-07	0.0000	6.389E-06	0.0008	2.696E-07	0.0000
Total	1.829E-06	0.0002	5.364E-09	0.0000	0.000E+00	0.0000	1.302E-03	0.1565	2.848E-07	0.0000	6.389E-06	0.0008	2.696E-07	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 9.200E+01 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Tc-99	6.764E-03	0.8129	7.632E-06	0.0009	0.000E+00	0.0000	2.346E-04	0.0282	1.229E-07	0.0000	3.445E-06	0.0004	8.321E-03	1.0000
Total	6.764E-03	0.8129	7.632E-06	0.0009	0.000E+00	0.0000	2.346E-04	0.0282	1.229E-07	0.0000	3.445E-06	0.0004	8.321E-03	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	14 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  15
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Tc-99	7.481E-10	0.0002	2.194E-12	0.0000	0.000E+00	0.0000	5.327E-07	0.1579	1.165E-10	0.0000	2.613E-09	0.0008	1.103E-10	0.0000
Total	7.481E-10	0.0002	2.194E-12	0.0000	0.000E+00	0.0000	5.327E-07	0.1579	1.165E-10	0.0000	2.613E-09	0.0008	1.103E-10	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Tc-99	2.739E-06	0.8116	3.090E-09	0.0009	0.000E+00	0.0000	9.500E-08	0.0282	4.975E-11	0.0000	1.395E-09	0.0004	3.375E-06	1.0000
Total	2.739E-06	0.8116	3.090E-09	0.0009	0.000E+00	0.0000	9.500E-08	0.0282	4.975E-11	0.0000	1.395E-09	0.0004	3.375E-06	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	15 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  16
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	2.959E-21	0.0002	8.677E-24	0.0000	0.000E+00	0.0000	2.107E-18	0.1628	4.608E-22	0.0000	1.034E-20	0.0008	4.361E-22	0.0000
Total	2.959E-21	0.0002	8.677E-24	0.0000	0.000E+00	0.0000	2.107E-18	0.1628	4.608E-22	0.0000	1.034E-20	0.0008	4.361E-22	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Tc-99	1.044E-17	0.8068	1.178E-20	0.0009	0.000E+00	0.0000	3.622E-19	0.0280	1.897E-22	0.0000	5.318E-21	0.0004	1.294E-17	1.0000
Total	1.044E-17	0.8068	1.178E-20	0.0009	0.000E+00	0.0000	3.622E-19	0.0280	1.897E-22	0.0000	5.318E-21	0.0004	1.294E-17	1.0000

*Sum of all water independent and dependent pathways.

Attachment	1	Sheet No.	16 of 18
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ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  17
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

                                   Dose/Source Ratios Summed Over All Pathways
                             Parent and Progeny Principal Radionuclide Contributions Indicated
0  Parent    Product    Thread                        DSR(j,t) At Time in Years   (mrem/yr)/(pCi/g)
   (i)        (j)      Fraction   0.000E+00 5.000E-01 1.000E+00 3.000E+00 1.000E+01 3.000E+01 9.200E+01 3.000E+02 1.000E+03
 ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ
 Tc-99      Tc-99      1.000E+00  5.160E-02 3.234E-01 3.170E-01 2.941E-01 2.261E-01 1.067E-01 1.040E-02 4.218E-06 1.618E-17
 ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ
 The DSR includes contributions from associated (half-life ó 180 days) daughters.
0
                                 Single Radionuclide Soil Guidelines G(i,t) in pCi/g
                                    Basic Radiation Dose Limit = 1.500E+01 mrem/yr
0Nuclide
   (i)     t= 0.000E+00   5.000E-01   1.000E+00   3.000E+00   1.000E+01   3.000E+01   9.200E+01   3.000E+02   1.000E+03
 ÄÄÄÄÄÄÄÄ    ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ
 Tc-99      2.907E+02   4.638E+01   4.732E+01   5.101E+01   6.635E+01   1.406E+02   1.442E+03   3.556E+06  *1.697E+10
 ÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ   ÍÍÍÍÍÍÍÍÍÍ
 *At specific activity limit
0
            Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
            and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
         at tmin = time of minimum single radionuclide soil guideline
      and at tmax = time of maximum total dose =  0.4918 ñ 0.0010 years
0Nuclide  Initial        tmin       DSR(i,tmin) G(i,tmin) DSR(i,tmax) G(i,tmax)
   (i)    (pCi/g)      (years)                  (pCi/g)               (pCi/g)
 ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ
 Tc-99   8.000E-01  0.4918 ñ 0.0010 3.236E-01 4.636E+01 3.236E-01 4.636E+01
 ÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ ÍÍÍÍÍÍÍÍÍÍ
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Attachment	1	Sheet No.	17 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

ATTACHMENT 1

```
1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  18
 Summary : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

                                   Individual Nuclide Dose Summed Over All Pathways
                                     Parent Nuclide and Branch Fraction Indicated
ONuclide Parent   THF(i)                                          DOSE(j,t), mrem/yr
   (j)     (i)              t= 0.000E+00 5.000E-01 1.000E+00 3.000E+00 1.000E+01 3.000E+01 9.200E+01 3.000E+02 1.000E+03
 ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ    ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ
 Tc-99   Tc-99   1.000E+00    4.128E-02 2.587E-01 2.536E-01 2.352E-01 1.809E-01 8.535E-02 8.321E-03 3.375E-06 1.294E-17
 ïïïïïïï ïïïïïïï ïïïïïïïïï    ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï
 THF(i) is the thread fraction of the parent nuclide.


                                      Individual Nuclide Soil Concentration
                                     Parent Nuclide and Branch Fraction Indicated
ONuclide Parent   THF(i)                                            S(j,t), pCi/g
   (j)     (i)              t= 0.000E+00 5.000E-01 1.000E+00 3.000E+00 1.000E+01 3.000E+01 9.200E+01 3.000E+02 1.000E+03
 ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ    ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄ
 Tc-99   Tc-99   1.000E+00    8.000E-01 7.851E-01 7.705E-01 7.149E-01 5.498E-01 2.597E-01 2.538E-02 1.038E-05 4.105E-17
 ïïïïïïï ïïïïïïï ïïïïïïïïï    ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï ïïïïïïïïï
 THF(i) is the thread fraction of the parent nuclide.
ORESCALC.EXE execution time =    1.22 seconds
```

Attachment	1	Sheet No.	18 of 18
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
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ATTACHMENT 2

```
1RESRAD, Version 6.5      T« Limit = 180 days       03/22/2012  14:35  Page   1
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

                    Table of Contents
                    ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
          Part IV: Concentration of Radionuclides
          ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ

 Concentration of radionuclides in different media
      Time= 0.000E+00 ..................................   2
      Time= 5.000E-01 ..................................   3
      Time= 1.000E+00 ..................................   4
      Time= 3.000E+00 ..................................   5
      Time= 1.000E+01 ..................................   6
      Time= 3.000E+01 ..................................   7
      Time= 9.200E+01 ..................................   8
      Time= 3.000E+02 ..................................   9
      Time= 1.000E+03 ..................................  10
```

Attachment 2 Sheet No. 1 of 10
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

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1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 2
Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Concentration of radionuclides in environmental media
at t = 0.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	8.000E-01	8.000E-01	6.328E-06	0.000E+00	0.000E+00

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 0.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	0.000E+00	4.000E+03	4.000E+03	4.000E+03	4.000E+03	2.724E+01	2.204E+02	0.000E+00	0.000E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 2 Sheet No. 2 of 10
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

ATTACHMENT 2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   3
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 5.000E-01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	7.851E-01	7.851E-01	6.210E-06	1.972E+02	8.146E-01

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 5.000E-01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	1.975E+02	4.621E+03	5.793E+03	5.102E+03	5.280E+03	3.572E+01	3.224E+02	1.644E+01	4.110E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No.	3 of 10
Originator:	S. W. Clark	Date	3/22/2012
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1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 4
Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	7.705E-01	7.705E-01	6.095E-06	1.935E+02	7.995E-01

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 1.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	1.935E+02	4.529E+03	5.681E+03	5.419E+03	5.408E+03	3.786E+01	3.288E+02	1.600E+01	4.000E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 2 Sheet No. 4 of 10
Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   5
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 3.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	7.149E-01	7.149E-01	5.654E-06	1.795E+02	7.416E-01

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 3.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	1.795E+02	4.201E+03	5.270E+03	5.027E+03	5.017E+03	3.512E+01	3.050E+02	1.484E+01	3.711E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No.	5 of 10
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

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1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page   6
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 1.000E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	5.498E-01	5.498E-01	4.349E-06	1.380E+02	5.702E-01

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 1.000E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	1.380E+02	3.231E+03	4.053E+03	3.866E+03	3.858E+03	2.701E+01	2.346E+02	1.141E+01	2.853E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No. 6 of 10	
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
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1RESRAD, Version 6.5 T« Limit = 180 days 03/22/2012 14:35 Page 7
Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	2.597E-01	2.597E-01	2.054E-06	6.512E+01	2.690E-01

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 3.000E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	6.513E+01	1.526E+03	1.913E+03	1.825E+03	1.822E+03	1.275E+01	1.107E+02	5.385E+00	1.346E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

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Originator: S. W. Clark Date 3/22/2012
Chk'd By M. W. Perrott Date 3/22/2012
Calc. No. 0100H-CA-V0163 Rev. No. 2

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1RESRAD, Version 6.5      T« Limit = 180 days       03/22/2012  14:35  Page   8
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 9.200E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	2.538E-02	2.538E-02	2.007E-07	6.346E+00	2.622E-02

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 9.200E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	6.346E+00	1.490E+02	1.868E+02	1.782E+02	1.779E+02	1.245E+00	1.081E+01	5.247E-01	1.312E-01

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No.	8 of 10
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

ATTACHMENT 2

```
1RESRAD, Version 6.5      T« Limit = 180 days       03/22/2012  14:35  Page   9
Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 3.000E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	1.038E-05	1.038E-05	8.210E-11	2.569E-03	1.061E-05

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 3.000E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	2.570E-03	6.087E-02	7.617E-02	7.269E-02	7.255E-02	5.077E-04	4.407E-03	2.124E-04	5.311E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No.	9 of 10
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

ATTACHMENT 2

```
1RESRAD, Version 6.5      T« Limit = 180 days        03/22/2012  14:35  Page  10
 Concent : 116-H-5 SPA-12 J1FKM8 Tc-99
 File    : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\116-H-5_TC-99.RAD
```

Concentration of radionuclides in environmental media
at t = 1.000E+03 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Tc-99	4.105E-17	4.105E-17	3.247E-22	9.796E-15	4.047E-17

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Concentration of radionuclides in foodstuff media
at t = 1.000E+03 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Tc-99	9.797E-15	2.395E-13	2.978E-13	2.846E-13	2.840E-13	1.986E-15	1.721E-14	8.100E-16	2.025E-16

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment	2	Sheet No.	10 of 10
Originator:	S. W. Clark	Date	3/22/2012
Chk'd By	M. W. Perrott	Date	3/22/2012
Calc. No.	0100H-CA-V0163	Rev. No.	2

APPENDIX D

UCL CALCULATIONS

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 files will be stored in a U.S. Department of Energy, Richland Operations Office, repository. These calculations have been prepared in accordance with ENG-1, *Engineering Services*, ENG-1-4.5, "Project Calculation," Washington Closure Hanford, Richland, Washington. The following calculations are provided in this appendix.

116-H-5 Waste Site Cleanup Verification 95% UCL Calculation, 0100H-CA-V0164, Rev. 0, Washington Closure Hanford, Richland, Washington.

116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations, 0100H-CA-V0165, Rev. 0, Washington Closure Hanford, Richland, Washington.

116-H-5 Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater, 0100H-CA-V0166, Rev. 0, Washington Closure Hanford, Richland, Washington.

DISCLAIMER FOR CALCULATIONS

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

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-H

Discipline: Environmental *Calculation No: 0100H-CA-V0164

Subject: 116-H-5 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 = 47 Attm. 1 = 79 Total = 127	J. D. Skoglie	T. E. Queen	**B. L. Vedder**	D. F. Obenauer	6/22/11

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** 05/17/11	**Calc. No.** 0100H-CA-V0164	**Rev. No.** 0
Project 100-H Field Remediation	**Job No.** 14655	**Checked** T. E. Queen	**Date** 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 1 of 47

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
Sheet 6 to 29 - Calculation Sheet Verification Data - Shallow Zone, Deep Zone, Overburden, and Staging Pile Area
Sheet 30 to 43 - Ecology Software (MTCAStat) Results
Sheet 44 to 47 - Calculation Sheet Duplicate Analysis
Attachment 1 - 116-H-5, Verification Sampling Results (79 sheets)

Given/References:
1) Sample Results (Attachment 1).
2) Background values and remedial action goals (RAGs) are taken from DOE-RL (2005b), DOE-RL (2001), and Ecology (1996).
3) DOE-RL, 2001, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, DOE/RL-92-24, Rev. 4, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
4) 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.
5) 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.
6) Ecology, 1992, *Statistical Guidance for Ecology Site Managers*, Publication #92-54, Washington Department of Ecology, Olympia, Washington.
7) 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.
8) Ecology, 1996, *Model Toxic Control Act Cleanup Levels and Risk Calculations (CLARC II),* Publication #94-145, Washington State Department of Ecology, Olympia, Washington.
9) Ecology, 2011, Cleanup Levels and Risk Calculations (CLARC) Database, Washington State Department of Ecology, Olympia, Washington, <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.
10) 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.
11) 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 116-H-5 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 116-H-5 waste site underwent statistical sampling at four decision units; shallow zone, dep zone, overburden, and the staging pile area for verification sampling. Information on the re-samples taken at these locations are available in the RSVP.

Analytical results for all sampling locations are summarized in the tables provided on sheets 3, 4, and 5. Further information of the sample data quality is presented in the data quality assessment section of the associated RSVP.

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 (which includes primary and duplicate samples) 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 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 either the duplicate or split value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method and is listed in Table 2-1 of the SAP (DOE-RL 2009a) for certain constituents. All other constituents will have their own pre-determined TDL's based on the laboratory and method 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) 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/split 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/split result 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.

Weshington Closure Hanford CALCULATION SHEET

Originator J. D. Skoglie Date 05/17/11 Calc. No. 0100H-CA-V0164 Rev. No. 0
Project 100-H Field Remediation Job No. 14655 Checked T. E. Queen Date 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations Sheet No. 3 of 47

Summary (continued)

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

Results Summary - Shallow and Deep Zones

Analyte	SZ 95% UCL Result	SZ Maximum Result	DZ 95% UCL Result	DZ Maximum Result	Units
Carbon-14	0.800	-	0.898	-	pCi/g
Cesium-137	-	-	0.161	-	pCi/g
Cobalt-60	-	-	0.045	-	pCi/g
Europium-152	-	-	1.37	-	pCi/g
Nickel-63	3.72	-	3.11	-	pCi/g
Total beta radiostrontium	0.357	-	-	-	pCi/g
Tritium	2.08	-	2.49	-	pCi/g
Uranium-233/234	0.633	-	0.635	-	pCi/g
Uranium-238	0.646	-	0.622	-	pCi/g
Arsenic	6.53	-	6.3	-	mg/kg
Barium	62.4	-	69.8	-	mg/kg
Beryllium	0.198	-	0.089	-	mg/kg
Boron	1.59	-	-	1.2	mg/kg
Cadmium	0.0853	-	0.089	-	mg/kg
Chromium	12.9	-	11.6	-	mg/kg
Cobalt	6.30	-	6.2	-	mg/kg
Copper	14.4	-	15.3	-	mg/kg
Hexavalent chromium	-	0.060	-	-	mg/kg
Lead	18.8	-	18.7	-	mg/kg
Manganese	269	-	255	-	mg/kg
Mercury	-	0.019	-	0.020	mg/kg
Molybdenum	0.273	-	-	0.87	mg/kg
Nickel	11.5	-	11.7	-	mg/kg
Vanadium	48.2	-	47.0	-	mg/kg
Zinc	47.2	-	43.6	-	mg/kg
Chloride	-	2.1	-	17.6	mg/kg
Fluoride	0.98	-	1.3	-	mg/kg
Nitrogen in nitrate	2.44	-	34.0	-	mg/kg
Nitrogen in nitrate and nitrite	1.90	-	31.3	-	mg/kg
Nitrogen in nitrite	-	-	-	0.40	mg/kg
Sulfate	9.2	-	55.2	-	mg/kg
Acenaphthene	-	2.79	-	-	ug/kg
Anthracene	-	7.60	-	5.1	ug/kg
Benzo(a)anthracene	20.8	-	-	54	ug/kg
Benzo(a)pyrene	18.8	-	-	41	ug/kg
Benzo(b)fluoranthene	14.0	-	-	51	ug/kg
Benzo(ghi)perylene	11.7	-	-	32	ug/kg
Benzo(k)fluoranthene	6.75	-	-	30	ug/kg
Bis(2-ethylhexl)phthalate	-	-	67	-	ug/kg
Chrysene	23.6	-	-	45	ug/kg
Dibenz[a,h]anthracene	-	2.75	-	-	ug/kg
Fluorene	-	1.57	-	-	ug/kg
Fluoranthene	66.6	-	-	69	ug/kg
Indeno(1,2,3-cd)pyrene	13.6	-	-	35	ug/kg
Naphthalene	-	15.0	-	-	ug/kg
Phenanthrene	21.7	-	-	18	ug/kg
Pyrene	25.4	-	-	77	ug/kg
Aroclor-1260	-	3.85	-	7.31	ug/kg
4,4'-DDD	-	-	-	2.12	ug/kg
4,4'-DDE	-	0.45	-	-	ug/kg
4,4'-DDT	-	-	-	3.10	ug/kg
TPH-diesel range	-	2600	-	-	ug/kg
TPH-diesel range EXT	-	8100	-	-	ug/kg
TPH-motor oil (high boiling)	13352	-	33760	-	ug/kg

3-Part Test Evaluation:

95% UCL or maximum* >	SZ		DZ	
Cleanup Limit?	YES	NO	YES	YES
> 10% above Cleanup Limit?	YES	NO	YES	YES
Any sample > 2x Cleanup Limit?	YES	NO	YES	YES

*The 95% UCL result or maximum value, depending on data censorship,

-- = not applicable
B = blank contamination (inorganic constituents)
C = Sample was ≤5X the blank concentration
CVP = closeout verification package
D = dilution
DE = direct exposure
GW = groundwater
J = estimate
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
SAP = sampling and analysis plan
TDL = target detection limit
U = undetected
UCL = upper confidence limit
WAC = Washington Administrative Code

Washington Closure Hanford CALCULATION SHEET

Originator J. D. Skoglie Date 05/17/11 Calc. No. 0100H-CA-V0164 Rev. No. 0
Project 100-H Field Reclamation Job No. 14655 Checked T. E. Queen Date 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations Sheet No. 4 of 47

Summary (continued)

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

Results Summary - Overburden and Staging Pile Area

Analyte	OB 95% UCL Result	OB Maximum Result	SPA 95% UCL Result	SPA Maximum Result	Units
Carbon-14	0.866	-	-	-	pCi/g
Cesium-137	-	-	0.0245	-	pCi/g
Plutonium-238	0.268	-	-	-	pCi/g
Technetium-99	-	-	0.499	-	pCi/g
Tritium	0.570	-	-	-	pCi/g
Uranium-233/234	1.16	-	0.0822	-	pCi/g
Uranium-238	0.547	-	1.10	-	pCi/g
Antimony	0.414	-	-	-	mg/kg
Arsenic	5.89	-	14.0	-	mg/kg
Barium	53.8	-	80.0	-	mg/kg
Beryllium	0.174	-	0.17	-	mg/kg
Boron	1.43	-	2.4	-	mg/kg
Cadmium	0.094	-	0.12	-	mg/kg
Chromium	11.5	-	11.0	-	mg/kg
Cobalt	5.58	-	6.9	-	mg/kg
Copper	13.6	-	14.8	-	mg/kg
Hexavalent chromium	0.16	-	-	-	mg/kg
Lead	17.0	-	33.4	-	mg/kg
Manganese	258	-	283	-	mg/kg
Mercury	-	-	-	0.014	mg/kg
Molybdenum	0.318	-	-	0.33	mg/kg
Nickel	10.8	-	10.8	-	mg/kg
Silver	-	0.156	-	-	mg/kg
Vanadium	44.4	-	48.0	-	mg/kg
Zinc	43.4	-	41.1	-	mg/kg
Chloride	-	20.6	-	9.5	mg/kg
Fluoride	0.8	-	1.0	-	mg/kg
Nitrogen in nitrate	3.0	-	15.3	-	mg/kg
Nitrogen in nitrate and nitrite	2.4	-	16.0	-	mg/kg
Sulfate	8.2	-	51.6	-	mg/kg
Acenaphthene	-	21.9	-	-	ug/kg
Acenapthylene	-	-	-	27	ug/kg
Anthracene	-	58.4		87	ug/kg
Benzo(a)anthracene	78.5	-	58	-	ug/kg
Benzo(a)pyrene	83.1	-	88.5	-	ug/kg
Benzo(b)fluoranthene	105	-	48	-	ug/kg
Benzo(ghi)perylene	62.9	-	-	96	ug/kg
Benzo(k)fluoranthene	21.9	-	23	-	ug/kg
Bis(2-ethylhex)phthalate	-	120	121	-	ug/kg
Chrysene	113	-	47	-	ug/kg
Dibenz[a,h]anthracene	6.29	-	-	26	ug/kg
Fluoranthene	188	-	-	400	ug/kg
Fluorene	-	32.3	-	57	ug/kg
Indeno(1,2,3-cd)pyrene	83.4	-	36	-	ug/kg
Naphthalene	-	25.1	-	-	ug/kg
Phenanthrene	107	-	50	-	ug/kg
Pyrene	342	-	105	-	ug/kg
Aroclor-1254	-	-	-	15	ug/kg
Aroclor-1260	-	-	-	10	ug/kg
4,4'-DDE	-	0.45	-	40	ug/kg
4,4'-DDT	-		-	5.3	ug/kg
TPH-diesel range	-	3200	6149	-	ug/kg
TPH-diesel range EXT	-	6500	19353	-	ug/kg
TPH-motor oil (high boiling)	-	15000	147061	-	ug/kg

3-Part Test Evaluation:

	OB		SPA	
95% UCL or maximum[a] >				
Cleanup Limit?	YES	NO	YES	YES
> 10% above Cleanup Limit?	YES	NO	YES	YES
Any sample > 2x Cleanup Limit?	YES	NO	YES	YES

[a]The 95% UCL result or maximum value, depending on data censorship,

-- = not applicable
B = blank contamination (inorganic constituents)
C = Sample was ≤5X the blank concentration
CVP = closeout verification package
D = dilution
DE = direct exposure
GW = groundwater
J = estimate
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
SAP = sampling and analysis plan
TDL = target detection limit
U = undetected
UCL = upper confidence limit
WAC = Washington Administrative Code

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie	**Date** 05/17/11	**Calc. No.** 0100H-CA-V0164	**Rev. No.** 0
Project 100-H Field Remediation	**Job No.** 14655	**Checked** T. E. Queen	**Date** 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 5 of 47

Summary (continued)

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

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

Analyte	Duplicate Analysis			
	SZ	DZ	OB	SPA
Potassium-40	11.6%	0.0%	12.4%	24.3%
Radium-226	1.9%	13.7%	–	11.4%
Radium-228	7.1%	–	–	–
Aluminum	10.0%	5.7%	4.8%	3.0%
Barium	12.0%	3.0%	8.5%	10.1%
Calcium	4.8%	6.6%	12.1%	2.3%
Chromium	28.6%	16.5%	2.9%	8.7%
Copper	9.2%	13.3%	0.0%	7.6%
Iron	14.9%	4.1%	2.5%	1.5%
Magnesium	12.8%	8.3%	1.0%	7.2%
Manganese	8.2%	3.1%	4.5%	1.3%
Silicon	10.9%	13.1%	13.0%	17.3%
Vanadium	18.5%	3.3%	7.3%	6.0%
Zinc	10.9%	23.8%	3.2%	1.1%
Benzo(a)anthracene (Method 8310)	–	–	–	30.0%
Benzo(a)pyrene (Method 8310)	–	–	–	***34.5%***
Benzo(b)fluoranthene (Method 8310)	–	–	–	30.3%
Chrysene (Method 8310)	–	–	–	13.3%
Fluoranthene (Method 8310)	–	–	–	***31.9%***
Indeno (1,2,3-cd)pyrene (Method 8310)	–	–	–	8.7%
Phenanthrene (Method 8310)	–	–	–	***59.5%***
Pyrene (Method 8310)	–	–	–	28.6%
TPH motor oil (high boiling)	–	–	–	***45.6%***

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

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 6 of 47

1 **116-H-5 Statistical Calculations**
2 **Verification Data -Shallow Zone**

3	Sample	Sample	Sample	Carbon-14			Nickel-63			Total beta radiostrontium			Tritium			Uranium-233/234			Uranium-238		
4	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
5	SZ-2	J19YB9	5/18/10	0.701	UJ	0.814	0	U	3.08	0	U	0.316	2.83	J	2.55	0.77		0.226	0.681		0.226
6	Duplicate of J19YB9	J19YD0	5/18/10	1.20		0.938	0.357	U	2.66	0	U	0.236	0	U	3.15	0.930		0.178	0.768		0.178
7	SZ-1	J19YB8	5/18/10	0.772	UJ	0.882	0	U	3.17	0	U	0.303	4.84	J	2.66	0.266		0.157	0.225		0.157
8	SZ-3	J19YC0	5/18/10	0.773	UJ	0.799	0.638	U	2.96	0.00100	U	0.277	3.97	J	2.63	0.395		0.233	0.426		0.233
9	SZ-4	J19YC1	5/18/10	0.946	J	0.802	0	U	3.32	0	U	0.296	4.01	J	2.53	0.326		0.226	0.444		0.226
10	SZ-5	J19YC2	5/18/10	0.809	UJ	0.970	0	U	3.22	0.0280	U	0.257	3.72	J	2.63	0.811		0.222	0.753		0.222
11	SZ-6	J19YC3	5/18/10	0.603	UJ	0.893	0	U	3.02	0	U	0.264	4.70	J	2.78	0.739		0.202	0.739		0.202
12	SZ-7	J19YC4	5/18/10	0.874	J	0.805	0	U	2.90	0.0120	U	0.281	5.90	J	2.59	0.594		0.216	0.678		0.216
13	SZ-8	J19YC5	5/18/10	0.521	UJ	0.916	0	U	2.98	2.40		0.242	0.994	J	2.73	0.724		0.213	0.669		0.213
14	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.000142	U	0.463	0	U	13.8	0	U	0.174	0.0527		0.0245	0.0792	U	0.114	0.214		0.123
15	SZ-10	J19YC7	5/18/10	0.520	UJ	0.801	1.05	U	2.96	0	U	0.251	3.75	J	2.64	0.609		0.245	0.833		0.245
16	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0	U	0.464	18.5		14.6	0	U	0.193	0.0530		0.0137	0.196		0.123	0.454		0.137
17	SZ-12	J19YC9	5/18/10	0.951		0.867	1.28	U	2.97	0	U	0.252	0	U	2.97	0.552		0.156	0.368		0.156

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Carbon-14	Nickel-63	Total beta radiostrontium	Tritium	Uranium-233/234	Uranium-238
21	Area	Number	Date	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
22	SZ-2	J19YB9/ J19YD0	5/18/10	0.951	0.179	0	1.42	0.850	0.725
23	SZ-1	J19YB8	5/18/10	0.772	0	0	4.84	0.266	0.225
24	SZ-3	J19YC0	5/18/10	0.773	0.638	0	3.97	0.395	0.426
25	SZ-4	J19YC1	5/18/10	0.946	0	0	4.01	0.326	0.444
26	SZ-5	J19YC2	5/18/10	0.809	0	0.0280	3.72	0.811	0.753
27	SZ-6	J19YC3	5/18/10	0.603	0	0	4.70	0.739	0.739
28	SZ-7	J19YC4	5/18/10	0.874	0	0.0120	5.90	0.594	0.678
29	SZ-8	J19YC5	5/18/10	0.521	0	2.40	0.994	0.724	0.669
30	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0	0	0	0.0527	0.079	0.214
31	SZ-10	J19YC7	5/18/10	0.520	1.05	0	3.75	0.609	0.833
32	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0	18.5	0	0.0530	0.196	0.454
33	SZ-12	J19YC9	5/18/10	0.951	1.28	0	0	0.552	0.368

34 **Statistical Computations**

35		Carbon-14	Nickel-63	Total beta radiostrontium	Tritium	Uranium-233/234	Uranium-238
36	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.
37	N	12	12	12	12	12	12
38	% < Detection limit	67%	92%	92%	8%	8%	0%
39	Mean	0.640	1.21	0.0290	1.07	0.512	0.544
40	Standard deviation	0.338	5.28	0.692	2.13	0.255	0.214
41	Z-statistic	1.64	1.64	1.64	1.64	1.64	1.64
42	95% UCL on mean	0.800	3.72	0.357	2.08	0.633	0.646
43	Maximum value	1.20	18.5	2.40	5.90	0.930	0.833

Footnotes apply to all calculations sheets and attachment 1.

[a] Location re-sampled due to RAG exceedance. All replaced data is shown in attachment 1 and is for information only. Re-sample strategy is further explained in the RSVP.

[b] Nitrate, nitrite, and phosphate were converted to nitrogen in nitrate, nitrogen in nitrite, and phosphorus in phosphate respectively.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 7 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Shallow Zone**

3	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead			Manganese		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	SZ-2	J19YB9	5/18/10	4.27		0.907	67.8		0.453	0.263		0.181	1.22	B	1.81	0.227	U	0.227	21.2		0.907	6.33		2.72	12.5		1.81	4.66		0.907	278		0.907
6	Duplicate of J19YB9	J19YD0	5/18/10	3.99		0.695	60.1		0.348	0.232		0.139	1.11	B	1.39	0.073	B	0.174	15.9		0.695	5.42		2.09	11.4		1.39	5.41		0.695	256		0.695
7	SZ-1	J19YB8	5/18/10	2.13		0.742	33.6		0.371	0.13	B	0.148	0.759	B	1.48	0.0410	B	0.186	8.93		0.742	4.91		2.23	12.2		1.48	3.44		0.742	227		0.742
8	SZ-3	J19YC0	5/18/10	2.83		0.801	69.8		0.401	0.208		0.160	3.44		1.60	0.0861	B	0.200	12.7		0.801	5.79		2.40	13.1		1.60	8.37		0.801	268		0.801
9	SZ-4	J19YC1	5/18/10	5.32		0.902	51.9		0.451	0.172	B	0.180	1.26	B	1.80	0.0649	B	0.225	10.4		0.902	6.11		2.71	16.1		1.80	15.2		0.902	257		0.902
10	SZ-5	J19YC2	5/18/10	6.45		0.767	46.7		0.383	0.192		0.153	1.12	B	1.53	0.0602	B	0.192	11.0		0.767	5.45		2.30	13.0		1.53	15.9		0.767	263		0.767
11	SZ-6	J19YC3	5/18/10	3.75		0.837	63.4		0.418	0.216		0.167	1.26	B	1.67	0.0586	B	0.209	12.8		0.837	6.41		2.51	12.8		1.67	6.41		0.837	274		0.837
12	SZ-7	J19YC4	5/18/10	6.58		0.378	52.0		0.486	0.193	B	0.194	1.18	B	1.94	0.0522	B	0.243	11.7		0.971	5.82		2.91	13.3		1.94	17.3		0.971	272		0.971
13	SZ-8	J19YC5	5/18/10	4.84		0.753	62.2		0.377	0.206		0.151	1.34	B	1.51	0.101	B	0.188	12.6		0.753	5.65		2.26	12.0		1.51	15.1		0.753	270		0.753
14	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	4.80		0.630	69.6		0.073	0.110	BM	0.032	1.00	B	0.940	0.0740	BM	0.0390	9.90	X	0.055	6.60	X	0.095	17.3		0.21	8.00		0.260	284	X	0.095
15	SZ-10	J19YC7	5/18/10	7.65		0.678	54.8		33.9	0.181		0.136	0.967	B	1.36	0.0594	B	0.170	10.2		0.678	5.60		2.04	14.3		1.36	24.2		0.678	266		0.678
16	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	1.10		0.580	43.0		0.066	0.029	U	0.029	0.860	U	0.860	0.0700	B	0.0360	5.3	X	0.051	7.60	X	0.087	14.5		0.19	2.30		0.240	234	X	0.087
17	SZ-12	J19YC9	5/18/10	3.06		0.859	50.7		0.430	0.155	B	0.172	1.00	B	1.72	0.105	B	0.215	13.1		0.859	5.38		2.58	12.5		1.72	5.80		0.859	251		0.859

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
22	SZ-2	J19YB9/ J19YD0	5/18/10	4.13	64.0	0.248	1.17	0.0933	18.6	5.88	12.0	5.04	267
23	SZ-1	J19YB8	5/18/10	2.13	33.6	0.130	0.759	0.0410	8.9	4.91	12.2	3.44	227
24	SZ-3	J19YC0	5/18/10	2.83	69.8	0.208	3.44	0.0861	12.7	5.79	13.1	8.37	268
25	SZ-4	J19YC1	5/18/10	5.32	51.9	0.172	1.26	0.0649	10.4	6.11	16.1	15.2	257
26	SZ-5	J19YC2	5/18/10	6.45	46.7	0.192	1.12	0.0602	11.0	5.45	13.0	15.9	263
27	SZ-6	J19YC3	5/18/10	3.8	63.4	0.216	1.26	0.0586	12.8	6.41	12.8	6.41	274
28	SZ-7	J19YC4	5/18/10	6.58	52.0	0.193	1.18	0.0522	11.7	5.82	13.3	17.3	272
29	SZ-8	J19YC5	5/18/10	4.84	62.2	0.206	1.34	0.101	12.6	5.65	12.0	15.1	270
30	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	4.80	69.6	0.110	1.00	0.0740	9.90	6.60	17.3	8.00	284
31	SZ-10	J19YC7	5/18/10	7.65	54.8	0.181	0.967	0.0594	10.2	5.60	14.3	24.2	266
32	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	1.10	43.0	0.015	0.430	0.0700	5.30	7.60	14.5	2.30	234
33	SZ-12	J19YC9	5/18/10	3.06	50.7	0.155	1.00	0.105	13.1	5.38	12.5	5.80	251

34 **Statistical Computations**

35		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
36	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), 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), 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), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.
37	N	12	12	12	12	12	12	12	12	12	12
38	% < Detection limit	0%	0%	8%	8%	0%	0%	0%	0%	0%	0%
39	Mean	4.39	55.1	0.169	1.24	0.0721	11.4	5.93	13.6	10.59	261
40	Standard deviation	1.94	11.0	0.0615	0.736	0.0202	3.12	0.694	1.68	6.76	16.6
41	95% UCL on mean	6.53	62.4	0.198	1.59	0.0853	12.9	6.30	14.4	18.8	269
42	Maximum value	7.65	69.8	0.263	3.44	0.105	21.2	7.60	17.3	24.2	284
43	**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
44	**WAC 173-340 3-PART TEST**										
45	95% UCL > Cleanup Limit?	NO	NA	NA	NO	NA	NO	NA	NA	YES	NA
46	> 10% above Cleanup Limit?	NO	NA	NA	NO	NA	NO	NA	NA	YES	NA
47	Any sample > 2X Cleanup Limit?	NO	NA	NA	NO	NA	NO	NA	NA	YES	NA
48	**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 (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.	The data set meets the 3-part test criteria when compared to the most stringent 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.	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 (512 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 8 of 47

1 116-H-5 Statistical Calculations
2 Verification Data -Shallow Zone

3	Sample	Sample	Sample	Molybdenum			Nickel			Vanadium			Zinc			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene			Benzo(ghi)perylene			Benzo(k)fluoranthene			Chrysene		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	SZ-2	J19YB9	5/18/10	0.294	B	0.907	15.6		2.27	52.6		0.91	37.8		2.72	3.87	U	3.87	3.87	U	3.87	1.16	J	3.87	3.87	U	3.87	3.87	U	3.87	3.87	U	3.87
6	Duplicate of J19YB9	J19YD0	5/18/10	0.243	B	0.695	12.2		1.74	43.7		0.70	33.9		2.09	0.858	J	3.43	1.20	J	3.43	1.54	J	3.43	1.03	J	3.43	3.43	U	3.43	3.43	U	3.43
7	SZ-1	J19YB8	5/18/10	0.252	B	0.742	8.94		1.86	42.9		0.74	29.0		2.23	1.05	J	3.51	3.51	U	3.51	0.878	J	3.51	3.51	U	3.51	3.51	U	3.51	1.05	J	3.51
8	SZ-3	J19YC0	5/18/10	0.271	B	0.801	10.9		2.00	47.0		0.80	68.7		2.40	4.71		3.36	5.05		3.36	6.73		3.36	3.87		3.36	2.52	J	3.36	5.38		3.36
9	SZ-4	J19YC1	5/18/10	0.276	B	0.902	9.84		2.25	46.8		0.90	38.0		2.71	7.32		3.48	6.97		3.48	11.3		3.48	3.48	U	3.48	3.49		3.48	8.37		3.48
10	SZ-5	J19YC2	5/18/10	0.233	B	0.767	10.0		1.92	46.1		0.77	33.4		2.30	8.99		3.52	8.99		3.52	9.17		3.52	6.52		3.52	3.88		3.52	11.5		3.52
11	SZ-6	J19YC3	5/18/10	0.321	B	0.837	10.8		2.09	52.8		0.84	39.2		2.51	3.11	J	3.45	3.98		3.45	7.95		3.45	3.63		3.45	1.73	J	3.45	2.94	J	3.45
12	SZ-7	J19YC4	5/18/10	0.260	B	0.971	10.0		2.43	49.4		0.97	35.8		2.91	11.2		3.49	11.4		3.49	18.4		3.49	10.1		3.49	5.77		3.49	16.4		3.49
13	SZ-8	J19YC5	5/18/10	0.252	B	0.753	10.2		1.88	45.2		0.75	69.8		2.26	6.59		3.46	8.15		3.46	12.0		3.46	9.36		3.46	3.99		3.46	4.68		3.46
14	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.250	U	0.250	11.1	X	0.12	42.6		0.090	35.2	X	0.38	10.0	J	3.40	11.0	J	6.80	5.70	JX	4.40	7.60	U	7.60	5.80	J	4.20	10.0	J	5.10
15	SZ-10	J19YC7	5/18/10	0.250	B	0.678	9.63		1.70	45.4		0.68	34.8		2.04	15.5		3.43	15.8		3.43	24.9		3.43	23.4		3.43	8.59		3.43	12.2		3.43
16	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.230	U	0.230	11.5	X	0.11	47.4		0.082	34.3	X	0.35	23.0		3.20	18.0		6.40	20.0		4.20	7.20	U	7.20	10.0	J	4.00	18.0	J	4.90
17	SZ-12	J19YC9	5/18/10	0.298	B	0.859	12.5		2.15	46.6		0.86	35.5		2.58	3.40	U	3.40	1.19	J	3.40	1.19	J	3.40	3.40	U	3.40	3.40	U	3.40	0.851	J	3.40

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19 Statistical Computation Input Data

20	Sample	Sample	Sample	Molybdenum	Nickel	Vanadium	Zinc	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
22	SZ-2	J19YB9/ J19YD0	5/18/10	0.269	13.9	48.2	35.9	1.40	1.57	1.35	1.48	1.83	1.83
23	SZ-1	J19YB8	5/18/10	0.252	8.94	42.9	29.0	1.05	1.76	0.88	1.76	1.76	1.05
24	SZ-3	J19YC0	5/18/10	0.271	10.9	47.0	68.7	4.71	5.05	6.73	3.87	2.52	5.38
25	SZ-4	J19YC1	5/18/10	0.276	9.84	46.8	38.0	7.32	6.97	11.3	1.74	3.49	8.37
26	SZ-5	J19YC2	5/18/10	0.233	10.0	46.1	33.4	8.99	8.99	9.17	6.52	3.88	11.5
27	SZ-6	J19YC3	5/18/10	0.321	10.8	52.8	39.2	3.11	3.98	7.95	3.63	1.73	2.94
28	SZ-7	J19YC4	5/18/10	0.260	10.0	49.4	35.8	11.2	11.4	18.4	10.1	5.77	16.4
29	SZ-8	J19YC5	5/18/10	0.252	10.2	45.2	69.8	6.59	8.15	12.0	9.36	3.99	4.68
30	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.125	11.1	42.6	35.2	10.0	11.0	5.70	3.80	5.80	10.0
31	SZ-10	J19YC7	5/18/10	0.250	9.63	45.4	34.8	15.5	15.8	24.9	23.4	8.59	12.2
32	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.115	11.5	47.4	34.3	23.0	18.0	20.0	3.60	10.0	18.0
33	SZ-12	J19YC9	5/18/10	0.298	12.5	46.6	35.5	1.70	1.19	1.19	1.70	1.70	0.851

34 Statistical Computations

35		Molybdenum	Nickel	Vanadium	Zinc	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene
36	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), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat normal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
37	N	12	12	12	12	12	12	12	12	12	12
38	% < Detection limit	17%	0%	0%	0%	8%	8%	0%	42%	25%	8%
39	Mean	0.243	10.8	46.7	40.8	7.88	7.82	10.0	5.91	4.25	7.77
40	Standard deviation	0.0622	1.36	2.74	13.5	6.50	5.52	7.79	6.23	2.79	5.92
41	95% UCL on mean	0.273	11.5	48.2	47.2	20.8	18.8	14.0	11.7	6.75	23.6
42	Maximum value	0.321	15.6	52.8	69.8	23.0	18.0	24.9	23.4	10.0	18.0
43	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	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	48000 ug/kg GW & River Protection	15 ug/kg GW & River Protection	100 ug/kg GW & River Protection
44	WAC 173-340 3-PART TEST										
45	95% UCL > Cleanup Limit?	NO	NA	NA	NO	YES	YES	NO	NO	NO	NO
46	> 10% above Cleanup Limit?	NO	NA	NA	YES	YES	YES	YES	NO	NO	NO
47	Any sample > 2X Cleanup Limit?	NO	NA	NA	NO	NO	NO	NO	NO	NO	NO
48	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.	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.	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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 9 of 47

1 116-H-5 Statistical Calculations
2 Verification Data -Shallow Zone

3	Sample	Sample	Sample	Fluoranthene			Indeno(1,2,3-cd)pyrene			Phenanthrene			Pyrene			Fluoride			Nitrogen in Nitrate [b]			Nitrogen in Nitrite and Nitrate			Sulfate			TPH-motor oil (high boiling)		
4	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL
5	SZ-2	J19YB9	5/18/10	3.87	U	3.87	3.87	U	3.87	1.16	J	3.87	3.87	U	3.87	0.70	B	2.8	0.59	JB	0.63	0.49		0.22	2.6	B	2.8	11500	UJ	11500
6	Duplicate of J19YB9	J19YD0	5/18/10	2.57	J	3.43	3.43	U	3.43	1.20	J	3.43	3.43	U	3.43	0.80	B	2.5	0.84		0.56	0.62		0.19	3.2		2.5	10200	U	10200
7	SZ-1	J19YB8	5/18/10	2.46	J	3.51	3.51	U	3.51	1.58	J	3.51	1.23	J	3.51	0.50	B	2.6	0.84	J	0.59	1.4		0.22	3.2		2.6	10500	UJ	10500
8	SZ-3	J19YC0	5/18/10	21.4		3.36	4.54		3.36	7.57		3.36	14.5		3.36	0.70	B	2.2	0.18	JB	0.50	0.15	B	0.19	1.9	B	2.2	27600	J	9940
9	SZ-4	J19YC1	5/18/10	19.9		3.48	7.15		3.48	5.93		3.48	17.3		3.48	0.80	B	2.6	1.06	J	0.59	0.69		0.22	4.6		2.6	4760	J	10300
10	SZ-5	J19YC2	5/18/10	31.2		3.52	6.70		3.52	11.6		3.52	23.1		3.52	0.40	B	2.5	1.81	J	0.56	1.17		0.21	5.4		2.5	10600	UJ	10600
11	SZ-6	J19YC3	5/18/10	9.34		3.45	5.01		3.45	3.98		3.45	6.40		3.45	0.40	B	2.6	1.94	J	0.59	1.03		0.22	10.2		2.6	4330	J	10000
12	SZ-7	J19YC4	5/18/10	27.1		3.49	9.97		3.49	10.5		3.49	29.4		3.49	0.90	B	2.5	0.75	J	0.56	0.67		0.20	6.2		2.5	4900	J	10400
13	SZ-8	J19YC5	5/18/10	25.0		3.46	8.32		3.46	9.88		3.46	16.5		3.46	0.90	B	2.5	3.37	J	0.56	2.43		0.20	14.3		2.5	3850	J	10300
	SZ-9	J19YC6	5/18/10																									29900	J	10200
14	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	14.0	U	14.0	13.0	U	13.0	13.0	U	13.0	14.0	J	13.0	1.5	B	0.88	1.10	B	0.34	0.53	BMN	0.38	5.8		1.8			
15	SZ-10	J19YC7	5/18/10	38.5		3.43	16.8		3.43	10.8		3.43	39.4		3.43	0.50	B	2.4	2.08	J	0.54	1.68		0.22	9.3		2.4	4620	J	10200
	SZ-11	J19YC8	5/18/10																									6290	J	10300
16	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	48.0		13.0	14.0	J	12.0	31.0	J	12.0	47.0		12.0	0.81	U	0.81	0.40	B	0.31	0.37	U	0.37	2.1	B	1.7			
17	SZ-12	J19YC9	5/18/10	3.06	J	3.4	3.40	U	3.40	1.53	J	3.4	3.40	U	3.40	2.3	U	2.30	0.77		0.52	0.52		0.19	2.6		2.3	10200	U	10200

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19 Statistical Computation Input Data

20	Sample	Sample	Sample	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Fluoride	Nitrogen in Nitrate [b]	Nitrogen in Nitrite and Nitrate	Sulfate	TPH-motor oil (high boiling)
21	Area	Number	Date	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
22	SZ-2	J19YB9/ J19YD0	5/18/10	2.25	1.83	1.18	1.83	0.75	0.71	0.56	2.9	5425
23	SZ-1	J19YB8	5/18/10	2.46	1.76	1.58	1.23	0.50	0.84	1.40	3.2	5250
24	SZ-3	J19YC0	5/18/10	21.4	4.54	7.57	14.5	0.70	0.18	0.15	1.9	27600
25	SZ-4	J19YC1	5/18/10	19.9	7.15	5.93	17.3	0.80	1.06	0.69	4.6	4760
26	SZ-5	J19YC2	5/18/10	31.2	6.70	11.6	23.1	0.40	1.81	1.17	5.4	5300
27	SZ-6	J19YC3	5/18/10	9.34	5.01	3.98	6.40	0.40	1.94	1.03	10.2	4330
28	SZ-7	J19YC4	5/18/10	27.1	9.97	10.5	29.4	0.90	0.75	0.67	6.2	4900
29	SZ-8	J19YC5	5/18/10	25.0	8.32	9.88	16.5	0.90	3.37	2.43	14.3	3850
	SZ-9	J19YC6	5/18/10									29900
30	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	7.00	6.50	6.50	14.0	1.50	1.10	0.53	5.8	
31	SZ-10	J19YC7	5/18/10	38.5	16.8	10.8	39.4	0.50	2.08	1.68	9.3	4620
	SZ-11	J19YC8	5/18/10									6290
32	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	48.0	14.0	31.0	47.0	0.41	0.40	0.19	2.1	
33	SZ-12	J19YC9	5/18/10	3.06	1.70	1.53	1.70	1.15	0.77	0.52	2.6	5100

34 Statistical Computations

35		Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Fluoride	Nitrogen in Nitrate [b]	Nitrogen in Nitrite and Nitrate	Sulfate	TPH-motor oil (high boiling)
36	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), 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.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.
37	N	12	12	12	12	12	12	12	12	12
38	% < Detection limit	8%	33%	8%	17%	17%	0%	8%	0%	33%
39	Mean	19.6	7.0	8.5	17.7	0.74	1.25	0.92	5.7	8944
40	Standard deviation	15.1	4.8	8.0	14.9	0.34	0.90	0.66	3.8	9284
41	95% UCL on mean	66.6	13.6	21.7	25.4	0.98	2.44	1.90	9.2	13352
42	Maximum value	48.0	16.8	31.0	47.0	1.5	3.37	2.43	14.3	27600
43	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise	18000 ug/kg River Protection	330 ug/kg GW & River Protection	240000 ug/kg GW Protection	48000 ug/kg GW Protection	96 GW Protection	1000 GW Protection	1000 GW Protection	25000 GW Protection	200000 ug/kg DE, GW & River Protection
44	WAC 173-340 3-PART TEST									
45	95% UCL > Cleanup Limit?	NO	NO	NO	NO	NA	NA	NA	NA	NO
46	> 10% above Cleanup Limit?	NO	NO	NO	NO	NA	NA	NA	NA	NO
47	Any sample > 2X Cleanup Limit?	NO	NO	NO	NO	NA	NA	NA	NA	NO
48	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.	Because all values are below background (2.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (11.8 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (11.8 mg/kg) the WAC 173-340 3-part test is not required.	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.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 10 of 47

1 **116-H-5 Maximum Calculations**
2 **Verification Data -Shallow Zone**

3	Sample	Sample	Sample	Hexavalent chromium			Mercury			Acenaphthene			Anthracene			Dibenz[a,h]anthracene			Fluorene		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	SZ-2	J19YB9	5/18/10	0.230	U	0.230	0.015	B	0.030	3.87	U	3.87	3.87	U	3.87	3.87	U	3.87	3.87	U	3.87
6	Duplicate of J19YB9	J19YD0	5/18/10	0.210	U	0.210	0.027	U	0.027	3.43	U	3.43	3.43	U	3.43	3.43	U	3.43	3.43	U	3.43
7	SZ-1	J19YB8	5/18/10	0.060	B	0.210	0.026	U	0.026	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51	3.51	U	3.51
8	SZ-3	J19YC0	5/18/10	0.200	U	0.200	0.019	B	0.030	3.36	U	3.36	3.36	U	3.36	3.36	U	3.36	3.36	U	3.36
9	SZ-4	J19YC1	5/18/10	0.210	U	0.210	0.026	U	0.026	2.79	J	3.48	3.48	U	3.48	2.62	J	3.48	3.48	U	3.48
10	SZ-5	J19YC2	5/18/10	0.210	U	0.210	0.024	U	0.24	3.52	U	3.52	3.52	U	3.52	1.23	J	3.52	3.52	U	3.52
11	SZ-6	J19YC3	5/18/10	0.210	U	0.210	0.018	B	0.030	3.45	U	3.45	3.45	U	3.45	3.45	U	3.45	3.45	U	3.45
12	SZ-7	J19YC4	5/18/10	0.210	U	0.210	0.030	U	0.030	3.49	U	3.49	2.45	J	3.49	2.10	J	3.49	1.57	J	3.49
13	SZ-8	J19YC5	5/18/10	0.210	U	0.210	0.027	U	0.027	3.46	U	3.46	1.04	J	3.46	1.56	J	3.46	0.867	J	3.46
14	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.145	U	0.145	0.0054	U	0.0054	11.0	U	11.0	3.20	U	3.20	12.0	U	12.0	5.60	U	5.60
15	SZ-10	J19YC7	5/18/10	0.210	U	0.210	0.011	B	0.020	3.43	U	3.43	2.23	J	3.43	2.75	J	3.43	1.03	J	3.43
16	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.146	U	0.146	0.0050	U	0.0050	10.0	U	10.0	7.60	J	3.10	11.0	U	11.0	5.30	U	5.30
17	SZ-12	J19YC9	5/18/10	0.210	U	0.210	0.027	U	0.027	3.4	U	3.4	3.40	U	3.40	3.40	U	3.40	3.40	U	3.40

18 **Statistical Computations**

19		Hexavalent chromium			Mercury			Acenaphthene			Anthracene			Dibenz[a,h]anthracene			Fluorene		
20	% < Detection limit	92%			67%			92%			67%			58%			75%		
21	Maximum value	0.060			0.019			2.79			7.60			2.75			1.57		
22	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted	2		River Protection	0.33		GW & River Protection	96000 ug/kg		GW Protection	240000 ug/kg		GW Protection	30 ug/kg		GW & River Protection	64000 ug/kg		GW Protection
23	3-PART TEST																		
24	Maximum > Cleanup Limit?	NO			NA			NO			NO			NO			NO		
25	> 10% above Cleanup Limit?	NO			NA			NO			NO			NO			NO		
26	Any sample > 2X Cleanup Limit?	NO			NA			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 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.		

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29 **116-H-5 Maximum Calculations**
30 **Verification Data -Shallow Zone**

31	Sample	Sample	Sample	Naphthalene			Aroclor-1260			4,4'-DDE			TPH-diesel range			TPH-diesel range EXT			Chloride		
32	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL
33	SZ-2	J19YB9	5/18/10	3.87	U	3.87	14.6	U	14.6	1.46	UD	1.46	3830	U	3830				2.8	U	2.8
34	Duplicate of J19YB9	J19YD0	5/18/10	3.43	U	3.43	13.7	U	13.7	1.37	UD	1.37	3410	U	3410				2.5	U	2.5
35	SZ-1	J19YB8	5/18/10	3.51	U	3.51	13.8	U	13.8	1.38	UD	1.38	3490	U	3490				2.6	U	2.6
36	SZ-3	J19YC0	5/18/10	15.0		3.36	3.85	J	13.4	1.34	UD	1.34	3310	U	3310				2.2	U	2.2
37	SZ-4	J19YC1	5/18/10	3.48	U	3.48	13.8	U	13.8	1.39	UD	1.39	3430	U	3430				2.6	U	2.6
38	SZ-5	J19YC2	5/18/10	3.52	U	3.52	13.5	U	13.5	1.35	UD	1.35	3530	U	3530				2.5	U	2.5
39	SZ-6	J19YC3	5/18/10	3.45	U	3.45	13.7	U	13.7	1.37	UD	1.37	3350	U	3350				2.6	U	2.6
40	SZ-7	J19YC4	5/18/10	3.49	U	3.49	13.6	U	13.6	1.36	UD	1.36	3480	U	3480				2.5	U	2.5
41	SZ-8	J19YC5	5/18/10	3.46	U	3.46	13.7	U	13.7	1.37	UD	1.37	3440	U	3440				2.5	U	2.5
42	SZ-9 re-sample 1[a]	J1FKL4	3/16/11	13.0	U	13.0	2.70	U	2.70	0.25	U	0.25	2600	J	720	8100		1100	2.1	B	2.1
43	SZ-10	J19YC7	5/18/10	3.43	U	3.43	13.5	U	13.5	1.36	UD	1.36	3410	U	3410				2.4	U	2.4
44	SZ-11 re-sample 1[a]	J1FKL5	3/16/11	12.0	U	12.0	2.70	U	2.70	0.45	J	0.24	700	U	700	1200	J	1000	2.0	U	2.0
45	SZ-12	J19YC9	5/18/10	3.40	U	3.40	13.7	U	13.7	1.37	UD	1.37	3420	U	3420				2.3	U	2.3

46
47 **Statistical Computations**

48		Naphthalene			Aroclor-1260			4,4'-DDE			TPH-diesel range			TPH-diesel range EXT			Chloride		
49	% < Detection limit	92%			92%			92%			92%			0%			92%		
50	Maximum value	15.0			3.85			0.45			2600			8100			2.1		
51	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted	16000 ug/kg		GW Protection	17 ug/kg		GW & River Protection	3.3 ug/kg		River Protection	200000 ug/kg		DE, GW & River Protection	200000 ug/kg		DE, GW & River Protection	25000		GW Protection
52	3-PART TEST																		
53	Maximum > Cleanup Limit?	NO			NO			NO			NO			NO			NA		
54	> 10% above Cleanup Limit?	NO			NO			NO			NO			NO			NA		
55	Any sample > 2X Cleanup Limit?	NO			NO			NO			NO			NO			NA		
56	3-Part Test 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.			Because all values are below background (100 mg/kg) the 3-part test is not required.		

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 11 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Deep Zone**

3	Sample	Sample	Sample	Carbon-14			Cesium-137			Cobalt-60			Europium-152			Nickel-63			Tritium			Uranium-233/234			Uranium-238		
4	Area	Number	Date	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
5	DZ-1	J19YD1	5/18/10	0.718	UJ	0.918	0.069	U	0.069	0.086	U	0.086	0.174	U	0.174	0	U	2.97	4.53	J	2.71	0.766		0.279	0.620		0.279
6	Duplicate of J19YD1	J19YF3	5/18/10	0.903		0.883	0.074	U	0.074	0.085	U	0.085	0.192	U	0.192	0.440	U	2.98	0.202	U	3.10	0.567		0.181	0.543		0.181
7	DZ-2	J19YD2	5/18/10	0.203	UJ	0.850	0.089	U	0.089	0.082	U	0.082	0.240	U	0.240	0	U	3.03	2.13	UJ	2.60	0.318		0.244	0.510		0.244
8	DZ-3	J19YD3	5/18/10	1.23	J	0.881	0.095	U	0.095	0.108	U	0.108	0.230	U	0.230	0.524	U	3.17	1.79	UJ	2.58	0.380		0.242	0.570		0.242
9	DZ-4	J19YD4	5/18/10	0.534	UJ	0.841	0.078	U	0.078	0.103	U	0.103	0.209	U	0.209	0	U	3.02	2.55	UJ	2.64	0.395		0.202	0.501		0.202
10	DZ-5	J19YD5	5/18/10	0.267	UJ	0.961	0.056	U	0.056	0.068	U	0.068	0.162	U	0.162	0.0870	U	3.44	1.72	UJ	2.76	0.870		0.215	0.533		0.215
11	DZ-6	J19YD6	5/18/10	1.15	J	0.809	0.089	U	0.089	0.087	U	0.087	0.182	U	0.182	0	U	3.11	2.32	UJ	2.55	0.702		0.244	0.766		0.244
12	DZ-7	J19YD7	5/18/10	0.725	UJ	0.830	0.594		0.087	0.145		0.076	2.28		0.200	13.2		3.19	4.34	J	2.59	0.648		0.236	0.833		0.236
13	DZ-8	J19YD8	5/18/10	0.513	UJ	0.881	0.071	U	0.071	0.086	U	0.086	0.198	U	0.198	0	U	3.05	1.06	UJ	2.65	0.430		0.206	0.349		0.206
14	DZ-9	J19YD9	5/18/10	0.581	UJ	0.860	0.114	U	0.114	0.095	U	0.095	0.280	U	0.280	0	U	2.96	1.91	UJ	2.62	0.709		0.209	0.546		0.209
15	DZ-10	J19YF0	5/18/10	0.509	UJ	0.800	0.055	U	0.055	0.072	U	0.072	0.181	U	0.181	0.914	U	3.00	2.53	J	2.53	0.594		0.182	0.570		0.182
16	DZ-11	J19YF1	5/18/10	1.41		0.901	0.066	U	0.066	0.055	U	0.055	0.182	U	0.182	1.50	U	2.80	1.06	U	2.96	0.371		0.149	0.488		0.149
17	DZ-12	J19YF2	5/18/10	0.766	U	0.900	0.078	U	0.078	0.086	U	0.086	0.183	U	0.183	1.40	U	2.75	0.297	U	3.03	0.553		0.184	0.481		0.184

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Nickel-63	Tritium	Uranium-233/234	Uranium-238
21	Area	Number	Date	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
22	DZ-1	J19YD1/ J19YF3	5/18/10	0.811	0.036	0.043	0.092	0.220	2.37	0.667	0.582
23	DZ-2	J19YD2	5/18/10	0.203	0.045	0	0.120	0	2.13	0.318	0.510
24	DZ-3	J19YD3	5/18/10	1.23	0.048	0	0.115	0.524	1.79	0.380	0.570
25	DZ-4	J19YD4	5/18/10	0.534	0.039	0.052	0.105	0	2.55	0.395	0.501
26	DZ-5	J19YD5	5/18/10	0.267	0.028	0.034	0.081	0.0870	1.72	0.870	0.533
27	DZ-6	J19YD6	5/18/10	1.15	0.045	0	0.091	0	2.32	0.702	0.766
28	DZ-7	J19YD7	5/18/10	0.725	0.594	0.145	2.28	13.2	4.34	0.648	0.833
29	DZ-8	J19YD8	5/18/10	0.513	0.036	0.043	0.099	0	1.06	0.430	0.349
30	DZ-9	J19YD9	5/18/10	0.581	0.057	0.048	0.140	0	1.91	0.709	0.546
31	DZ-10	J19YF0	5/18/10	0.509	0.028	0.036	0.091	0.914	2.53	0.594	0.570
32	DZ-11	J19YF1	5/18/10	1.41	0.033	0	0.091	1.50	1.06	0.371	0.488
33	DZ-12	J19YF2	5/18/10	0.766	0.039	0.043	0.092	1.40	0.297	0.553	0.481

34 **Statistical Computations**

35		Carbon-14	Cesium-137	Cobalt-60	Europium-152	Nickel-63	Tritium	Uranium-233/234	Uranium-238
36	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.
37	N	12	12	12	12	12	12	12	12
38	% < Detection limit	67%	92%	92%	92%	92%	75%	0%	0%
39	Mean	0.720	0.085	0.029	1.07	1.34	2.01	0.553	0.561
40	Standard deviation	0.375	0.160	0.034	0.629	3.73	1.00	0.173	0.128
41	Z-statistic	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
42	95% UCL on mean	0.898	0.161	0.045	1.37	3.11	2.49	0.635	0.622
43	Maximum value	1.41	0.594	0.145	2.28	13.2	4.53	0.870	0.833

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
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Rev. No. 0
Date 05/17/11
Sheet No. 12 of 47

1 116-H-5 Statistical Calculations
2 Verification Data -Deep Zone

3	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Cadmium			Chromium			Cobalt			Copper			Lead		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	DZ-8 re-sample 2[a]	J1HH85	4/13/11	6.0		0.60	43.4		0.069	0.12	B	0.030	0.14	B	0.037	12.8		0.053	5.3	X	0.091	18.5		0.20	14.3	X	0.25
6	Duplicate of J1HH85[a]	J1HH86	4/13/11	6.7		0.64	42.1		0.074	0.13	B	0.032	0.19		0.040	15.1		0.056	5.4	X	0.097	16.2		0.21	17.3	X	0.26
7	DZ-1 re-sample 2[a]	J1HH80	4/13/11	7.0		0.65	60.9		0.074	0.13	B	0.032	0.067	B	0.040	9.8		0.057	6.2	X	0.098	14.0		0.21	18.5	X	0.26
8	DZ-2 re-sample 2[a]	J1HH81	4/13/11	2.5		0.61	57.7		0.070	0.063	B	0.031	0.046	B	0.038	6.2		0.054	6.4	X	0.093	15.3		0.20	4.2	X	0.25
9	DZ-3 re-sample 2[a]	J1HH82	4/13/11	1.9		0.64	59.7		0.074	0.042	B	0.032	0.042	B	0.040	15.1		0.057	6.6	X	0.098	13.4		0.21	2.9	X	0.26
10	DZ-4 re-sample 2[a]	J1HH83	4/13/11	4.8		0.63	68.3		0.073	0.16	B	0.032	0.081	B	0.039	12.9		0.056	6.3	X	0.096	14.4		0.21	11.4	X	0.26
11	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	9.8		0.63	35.5		0.072	0.031	U	0.031	0.039	U	0.039	7.6		0.055	5.1	X	0.095	12.8		0.21	31.3		0.26
12	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	1.8		0.59	50.3		0.068	0.030	U	0.030	0.052	B	0.037	7.2		0.052	5.5	X	0.090	15.4		0.19	8.4		0.24
13	DZ-7 re-sample 2[a]	J1HH84	4/13/11	4.2		0.69	34.7		0.079	0.098	B	0.034	0.055	B	0.043	8.8		0.060	4.7	X	0.10	11.7		0.23	11.3	X	0.28
14	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	1.1		0.62	77.1		0.072	0.031	U	0.031	0.039	U	0.039	6.5		0.055	5.5	X	0.095	12.7		0.21	3.5		0.26
15	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	2.4		0.65	57.4		0.075	0.033	U	0.033	0.041	U	0.041	8.7		0.057	5.7	X	0.099	13.6		0.21	6.0		0.27
16	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	2.8		0.67	69.0		0.077	0.074	B	0.034	0.042	U	0.042	11.6		0.059	6.4	X	0.10	15.9		0.22	8.4		0.27
17	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	3.2		0.68	90.3		0.078	0.034	U	0.034	0.064	B	0.042	8.3		0.060	6.7	X	0.10	15.8		0.22	9.8		0.28

19 Statistical Computation Input Data

20	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
22	DZ-8 re-sample 2[a]	J1HH85/ J1HH86	4/13/11	6.4	42.8	0.125	0.17	14.0	5.4	17.4	15.8
23	DZ-1 re-sample 2[a]	J1HH80	4/13/11	7.0	60.9	0.130	0.067	9.80	6.2	14.0	18.5
24	DZ-2 re-sample 2[a]	J1HH81	4/13/11	2.5	57.7	0.063	0.046	6.20	6.4	15.3	4.2
25	DZ-3 re-sample 2[a]	J1HH82	4/13/11	1.9	59.7	0.042	0.042	15.1	6.6	13.4	2.9
26	DZ-4 re-sample 2[a]	J1HH83	4/13/11	4.8	68.3	0.160	0.081	12.9	6.3	14.4	11.4
27	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	9.8	35.5	0.016	0.020	7.60	5.1	12.8	31.3
28	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	1.8	50.3	0.015	0.052	7.20	5.5	15.4	8.4
29	DZ-7 re-sample 2[a]	J1HH84	4/13/11	4.2	34.7	0.098	0.055	8.80	4.7	11.7	11.3
30	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	1.1	77.1	0.016	0.020	6.50	5.5	12.7	3.5
31	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	2.4	57.4	0.017	0.021	8.70	5.7	13.6	6.0
32	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	2.8	69.0	0.074	0.021	11.6	6.4	15.9	8.4
33	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	3.2	90.3	0.017	0.064	8.30	6.7	15.8	9.8

34 Statistical Computations

35		Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead
36	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), 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.
37	N	12	12	12	12	12	12	12	12
38	% < Detection limit	0%	0%	42%	33%	0%	0%	0%	0%
39	Mean	4.0	58.6	0.064	0.054	9.72	5.9	14.4	11.0
40	Standard deviation	2.6	16.5	0.053	0.041	2.98	0.65	1.63	7.98
41	95% UCL on mean	6.3	69.8	0.089	0.089	11.6	6.2	15.3	18.7
42	Maximum value	9.8	90.3	0.160	0.19	15.1	6.7	18.5	31.3
43	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)	20 GW & River Protection	200 GW Protection	1.51 GW & River Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection	22.0 River Protection	10.2 GW & River Protection
44	WAC 173-340 3-PART TEST								
45	95% UCL > Cleanup Limit?	NO	NA	NA	NA	NA	NA	NA	YES
46	> 10% above Cleanup Limit?	NO	NA	NA	NA	NA	NA	NA	YES
47	Any sample > 2X Cleanup Limit?	NO	NA	NA	NA	NA	NA	NA	YES
48	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 (132 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (1.51 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (0.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (18.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (15.7 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (22.0 mg/kg) the WAC 173-340 3-part test is not required.	A detailed assessment will be performed.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
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Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 13 of 47

116-H-5 Statistical Calculations

Verification Data -Deep Zone

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	Bis(2-ethylhexyl)phthalate ug/kg	Q	PQL	Fluoride mg/kg	Q	PQL	Nitrogen in Nitrate [b] mg/kg	Q	PQL	Nitrogen in nitrate and nitrite mg/kg	Q	PQL
DZ-8 re-sample 2[a]	J1HH85	4/13/11	221		0.091	9.9	X	0.11	35.9		0.086	60.8		0.36	69	JB	47	0.9	B	2.3	2.78	J	0.52	1.70		0.21
Duplicate of J1HH85[a]	J1HH86	4/13/11	228		0.097	11.3	X	0.12	37.1		0.091	77.2		0.39	83	JB	47	1.2	B	2.4	2.64		0.54	1.62		0.22
DZ-1 re-sample 2[a]	J1HH80	4/13/11	283		0.098	10.6	X	0.12	40.3		0.092	39.0		0.39	94	JB	48	0.6	B	2.2	1.02	J	0.50	0.66		0.22
DZ-2 re-sample 2[a]	J1HH81	4/13/11	252		0.093	8.1	X	0.11	48.7		0.087	35.5		0.37	80	JB	47	0.7	B	2.4	55.8	JD	2.76	43.4	D	2.12
DZ-3 re-sample 2[a]	J1HH82	4/13/11	231		0.098	12.8	X	0.12	56.4		0.092	34.4		0.39	72	JB	45	0.9	B	2.6	26.7	JD	1.20	22.7	D	1.03
DZ-4 re-sample 2[a]	J1HH83	4/13/11	261		0.096	11.5	X	0.12	41.9		0.090	38.9		0.38	89	JB	45	1.7	B	2.5	2.26	J	0.56	1.40		0.22
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	209		0.095	10.1	X	0.12	33.6		0.089	27.4	X	0.38	48	U	48	1.0	B	2.4	7.59	J	0.54	5.36		0.22
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	217		0.090	9.2	X	0.11	39.4		0.084	31.6	X	0.36	47	U	47	2.6	U	2.6	5.38	J	0.59	5.67		0.23
DZ-7 re-sample 2[a]	J1HH84	4/13/11	206		0.10	12.2	X	0.13	30.5		0.098	29.6		0.41	78	JB	48	0.6	B	2.5	1.13	J	0.56	0.79		0.23
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	219		0.095	6.8	X	0.12	47.9		0.089	30.9	X	0.38	45	U	45	0.3	B	2.4	0.79	J	0.54	0.63		0.21
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	230		0.099	9.2	X	0.12	35.4		0.093	31.3	X	0.39	47	U	47	0.4	B	2.5	3.19	J	0.56	2.08		0.21
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	260		0.10	13.5	X	0.13	40.9		0.096	44.7	X	0.41	51	U	51	1.1	B	2.5	4.02		0.56	2.94		0.22
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	284		0.10	11.3	X	0.13	54.7		0.097	46.2	X	0.41	48	U	48	1.1	B	2.3	5.11		0.52	4.37		0.20

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Nickel mg/kg	Vanadium mg/kg	Zinc mg/kg	Bis(2-ethylhexyl)phthalate ug/kg	Fluoride mg/kg	Nitrogen in Nitrate [b] mg/kg	Nitrogen in nitrate and nitrite mg/kg
DZ-8 re-sample 2[a]	J1HH85/ J1HH86	4/13/11	225	10.6	36.5	69.0	76	1.1	2.71	1.66
DZ-1 re-sample 2[a]	J1HH80	4/13/11	283	10.6	40.3	39.0	94	0.6	1.02	0.66
DZ-2 re-sample 2[a]	J1HH81	4/13/11	252	8.10	48.7	35.5	80	0.7	55.8	43.4
DZ-3 re-sample 2[a]	J1HH82	4/13/11	231	12.8	56.4	34.4	72	0.9	26.7	22.7
DZ-4 re-sample 2[a]	J1HH83	4/13/11	261	11.5	41.9	38.9	89	1.7	2.26	1.40
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	209	10.1	33.6	27.4	24	1.0	7.59	5.36
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	217	9.20	39.4	31.6	24	1.3	5.38	5.67
DZ-7 re-sample 2[a]	J1HH84	4/13/11	206	12.2	30.5	29.6	78	0.6	1.13	0.79
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	219	6.80	47.9	30.9	23	0.3	0.79	0.63
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	230	9.20	35.4	31.3	24	0.4	3.19	2.08
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	260	13.5	40.9	44.7	26	1.1	4.02	2.94
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	284	11.3	54.7	46.2	24	1.1	5.11	4.37

Statistical Computations

	Manganese	Nickel	Vanadium	Zinc	Bis(2-ethylhexyl)phthalate	Fluoride	Nitrogen in Nitrate [b]	Nitrogen in nitrate and nitrite
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.	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.
N	12	12	12	12	12	12	12	12
% < Detection limit	0%	0%	0%	0%	50%	8%	0%	0%
Mean	240	10.5	42.2	38.2	53	0.9	9.64	7.64
Standard deviation	27	1.95	8.2	11.3	31	0.4	16.1	12.8
95% UCL on mean	255	11.7	47.0	43.6	67	1.3	34.0	31.3
Maximum value	284	13.5	56.4	77.2	94	1.7	55.8	43.4
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise	512 GW & River Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	360 ug/kg River Protection	96.0 GW Protection	1000 GW Protection	1000 GW Protection
WAC 173-340 3-PART TEST								
95% UCL > Cleanup Limit?	NA	NA	NA	NO	NO	NA	NO	NO
> 10% above Cleanup Limit?	NA	NA	NA	NO	NO	NA	NO	NO
Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NO	NA	NO	NO
WAC 173-340 Compliance?	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (85.1 mg/kg) the WAC 173-340 3-part test is not required.	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 (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.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 14 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Deep Zone**

3	Sample	Sample	Sample	Sulfate			TPH-motor oil (high boiling)		
4	Area	Number	Date	mg/kg	Q	PQL	ug/kg	Q	PQL
5	DZ-8 re-sample 2[a]	J1HH85	4/13/11	7.8		2.3	5670	J	10200
6	Duplicate of J1HH85[a]	J1HH86	4/13/11	8.4		2.4	3480	J	10400
7	DZ-1 re-sample 2[a]	J1HH80	4/13/11	4.9		2.2	10400	UJ	10400
8	DZ-2 re-sample 2[a]	J1HH81	4/13/11	160	JD	12.2	10600	UJ	10600
9	DZ-3 re-sample 2[a]	J1HH82	4/13/11	101		2.6	10300	UJ	10300
10	DZ-4 re-sample 2[a]	J1HH83	4/13/11	8.1		2.5	9290	J	10400
11	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	17.6		2.4	10500	UJ	10500
12	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	19.2		2.6	127000	J	10500
13	DZ-7 re-sample 2[a]	J1HH84	4/13/11	10.3		2.5	4230	J	10300
14	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	5.8		2.4	18700	J	10400
15	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	11.3		2.5	6750	J	10400
16	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	18.6		2.5	6760	J	10500
17	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	25.3		2.3	8670	J	10100

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Sulfate			TPH-motor oil (high boiling)		
21	Area	Number	Date	mg/kg			ug/kg		
22	DZ-8 re-sample 2[a]	J1HH85/ J1HH86	4/13/11	8.1			4575		
23	DZ-1 re-sample 2[a]	J1HH80	4/13/11	4.9			5200		
24	DZ-2 re-sample 2[a]	J1HH81	4/13/11	160			5300		
25	DZ-3 re-sample 2[a]	J1HH82	4/13/11	101			5150		
26	DZ-4 re-sample 2[a]	J1HH83	4/13/11	8.1			9290		
27	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	17.6			5250		
28	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	19.2			127000		
29	DZ-7 re-sample 2[a]	J1HH84	4/13/11	10.3			4230		
30	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	5.8			18700		
31	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	11.3			6750		
32	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	18.6			6760		
33	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	25.3			8670		

34 **Statistical Computations**

35		Sulfate			TPH-motor oil (high boiling)		
36	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.		
37	N	12			12		
38	% < Detection limit	0%			33%		
39	Mean	32.5			17240		
40	Standard deviation	47.9			34789		
41	95% UCL on mean	55.2			33760		
42	Maximum value	160			127000		
43	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise**	25000	GW Protection		200000 ug/kg	GW & River Protection	
44	**WAC 173-340 3-PART TEST**						
45	95% UCL > Cleanup Limit?	NA			NO		
46	> 10% above Cleanup Limit?	NA			NO		
47	Any sample > 2X Cleanup Limit?	NA			NO		
48	**WAC 173-340 Compliance?**	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.		

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 15 of 47

1 116-H-5 Maximum Calculations
2 Verification Data -Deep Zone

3	Sample	Sample	Sample	Boron			Mercury			Molybdenum			Anthracene			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	DZ-8 re-sample 2[a]	J1HH85	4/13/11	0.90	U	0.90	0.019		0.0050	0.24	U	0.24	3.0	U	3.0	3.2	U	3.2	6.4	U	6.4	4.2	U	4.2
6	Duplicate of J1HH85[a]	J1HH86	4/13/11	0.95	U	0.95	0.020		0.0050	0.25	U	0.25	3.1	U	3.1	3.2	U	3.2	6.5	U	6.5	4.3	U	4.3
7	DZ-1 re-sample 2[a]	J1HH80	4/13/11	1.2	B	0.96	0.0055	U	0.0055	0.25	U	0.25	5.1	J	3.3	32		3.4	27		6.9	27		4.5
8	DZ-2 re-sample 2[a]	J1HH81	4/13/11	0.91	U	0.91	0.0051	U	0.0051	0.24	U	0.24	3.1	U	3.1	3.2	U	3.2	6.4	U	6.4	4.2	U	4.2
9	DZ-3 re-sample 2[a]	J1HH82	4/13/11	0.96	U	0.96	0.0053	U	0.0053	0.25	U	0.25	3.0	U	3.0	3.1	U	3.1	6.3	U	6.3	4.1	U	4.1
10	DZ-4 re-sample 2[a]	J1HH83	4/13/11	0.94	U	0.94	0.0057	U	0.0057	0.87	B	0.25	3.1	U	3.1	54		3.2	41		6.4	51		4.2
11	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	0.93	U	0.93	0.0056	U	0.0056	0.25	U	0.25	3.2	U	3.2	3.3	U	3.3	6.6	U	6.6	4.3	U	4.3
12	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	0.88	U	0.88	0.0057	U	0.0057	0.23	U	0.23	3.1	U	3.1	3.3	U	3.3	6.6	U	6.6	4.3	U	4.3
13	DZ-7 re-sample 2[a]	J1HH84	4/13/11	1.0	U	1.0	0.0063	U	0.0063	0.27	U	0.27	3.4	U	3.4	3.6	U	3.6	11	J	7.2	8.2	J	4.7
14	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	0.93	U	0.93	0.0055	U	0.0055	0.25	U	0.25	3.0	U	3.0	3.2	U	3.2	6.4	U	6.4	4.2	U	4.2
15	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	0.97	U	0.97	0.0054	U	0.0054	0.26	U	0.26	3.1	U	3.1	3.2	U	3.2	6.4	U	6.4	4.2	U	4.2
16	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	1.0	U	1.0	0.0060	U	0.0060	0.26	U	0.26	3.3	U	3.3	3.5	U	3.5	7.0	U	7.0	4.6	U	4.6
17	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	1.0	U	1.0	0.0052	U	0.0052	0.27	U	0.27	3.1	U	3.1	3.2	U	3.2	6.5	U	6.5	4.2	U	4.2

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19 Statistical Computations

20		Boron			Mercury			Molybdenum			Anthracene			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene		
21	% < Detection limit	92%			92%			92%			92%			83%			75%			75%		
22	Maximum value	1.2			0.020			0.87			5.1			54			41			51		
23	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted	320	GW Protection		0.33	GW & River Protection		8	GW Protection		240000 ug/kg	GW Protection		15 ug/kg	GW & River Protection		15 ug/kg	GW & River Protection		15 ug/kg	GW & River Protection	
24	3-PART TEST																					
25	Maximum > Cleanup Limit?	NO			NA			NO			NO			YES			YES			YES		
26	> 10% above Cleanup Limit?	NO			NA			NO			NO			YES			YES			YES		
27	Any sample > 2X Cleanup Limit?	NO			NA			NO			NO			YES			YES			YES		
28	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 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.			A detailed assessment will be performed.			A detailed assessment will be performed.			A detailed assessment will be performed.		

1 116-H-5 Maximum Calculations
2 Verification Data -Deep Zone

3	Sample	Sample	Sample	Benzo(ghi)perylene			Benzo(k)fluoranthene			Chrysene			Fluoranthene			Indeno(1,2,3-cd)pyrene			Phenanthrene			Pyrene		
4	Area	Number	Date	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	DZ-8 re-sample 2[a]	J1HH85	4/13/11	7.1	U	7.1	3.9	U	3.9	4.8	U	4.8	13	U	13	12	U	12	12	U	12	12	U	12
6	Duplicate of J1HH85[a]	J1HH86	4/13/11	7.3	U	7.3	4.0	U	4.0	4.9	U	4.9	13	U	13	12	U	12	12	U	12	12	U	12
7	DZ-1 re-sample 2[a]	J1HH80	4/13/11	16	J	7.7	13	J	4.2	26	J	5.2	43		14	19	J	13	18	J	13	48		13
8	DZ-2 re-sample 2[a]	J1HH81	4/13/11	7.2	U	7.2	4.0	U	4.0	4.9	U	4.9	13	U	13	12	U	12	12	U	12	12	U	12
9	DZ-3 re-sample 2[a]	J1HH82	4/13/11	7.1	U	7.1	3.9	U	3.9	4.8	U	4.8	13	U	13	12	U	12	12	U	12	12	U	12
10	DZ-4 re-sample 2[a]	J1HH83	4/13/11	32		7.2	30		4.0	45		4.9	69		13	35		12	17	J	12	77		12
11	DZ-5 re-sample 1[a]	J1FKK5	3/16/11	7.4	U	7.4	4.1	U	4.1	5.0	U	5.0	13	U	13	12	U	12	12	U	12	12	U	12
12	DZ-6 re-sample 1[a]	J1FKK6	3/16/11	7.4	U	7.4	4.1	U	4.1	5.0	U	5.0	13	U	13	12	U	12	12	U	12	12	U	12
13	DZ-7 re-sample 2[a]	J1HH84	4/13/11	8.1	U	8.1	5.8	J	4.4	8.6	J	5.4	15	U	15	13	U	13	13	U	13	15	J	13
14	DZ-9 re-sample 1[a]	J1FKK9	3/16/11	7.2	U	7.2	3.9	U	3.9	4.8	U	4.8	13	U	13	12	U	12	12	U	12	12	U	12
15	DZ-10 re-sample 1[a]	J1FKL0	3/16/11	7.2	U	7.2	4.0	U	4.0	4.9	U	4.9	13	U	13	12	U	12	12	U	12	12	U	12
16	DZ-11 re-sample 1[a]	J1FKL1	3/16/11	7.8	U	7.8	4.3	U	4.3	5.3	U	5.3	14	U	14	13	U	13	13	U	13	13	U	13
17	DZ-12 re-sample 1[a]	J1FKL2	3/16/11	7.3	U	7.3	4.0	U	4.0	4.9	U	4.9	13	U	13	12	U	12	12	U	12	12	U	12

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19 Statistical Computations

20		Benzo(ghi)perylene			Benzo(k)fluoranthene			Chrysene			Fluoranthene			Indeno(1,2,3-cd)pyrene			Phenanthrene			Pyrene		
21	% < Detection limit	83%			75%			75%			83%			83%			83%			75%		
22	Maximum value	32			30			45			69			35			18			77		
23	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted	48000 ug/kg	GW & River Protection		15 ug/kg	GW & River Protection		100 ug/kg	GW & River Protection		18000 ug/kg	River Protection		330 ug/kg	GW & River Protection		240000 ug/kg	GW Protection		48000 ug/kg	GW Protection	
24	3-PART TEST																					
25	Maximum > Cleanup Limit?	NO			YES			NO			NO			NO			NO			NO		
26	> 10% above Cleanup Limit?	NO			NO			NO			NO			NO			NO			NO		
27	Any sample > 2X Cleanup Limit?	NO			NO			NO			NO			NO			NO			NO		
28	3-Part Test Compliance?	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 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.		

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MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 16 of 47

1 **116-H-5 Maximum Calculations**
2 **Verification Data -Deep Zone**

	Sample Area	Sample Number	Sample Date	Aroclor-1260			4,4'-DDD			4,4'-DDT			Chloride			Nitrogen in nitrite [b]		
4				ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	DZ-1	J19YD1	5/18/10	13.7	U	13.7	1.37	UD	1.37	1.37	UD	1.37	2.3	U	2.3	0.70	UR	0.70
6	Duplicate of J19YD1	J19YF3	5/18/10	13.8	U	13.8	1.39	UD	1.39	1.39	UD	1.39	2.4	U	2.4	0.73	U	0.73
7	DZ-2	J19YD2	5/18/10	13.1	U	13.1	1.31	UD	1.31	1.31	UD	1.31	2.2	U	2.2	0.67	UR	0.67
8	DZ-3	J19YD3	5/18/10	7.31	J	13.9	2.12	JD	1.39	3.1	JD	1.39	17.6		2.4	0.40	JB	0.73
9	DZ-4	J19YD4	5/18/10	13.8	U	13.8	1.39	UD	1.39	1.39	UD	1.39	5.1		2.6	0.79	UR	0.79
10	DZ-5	J19YD5	5/18/10	13.3	U	13.3	1.33	UD	1.33	1.33	UD	1.33	2.5	U	2.5	0.76	UR	0.76
11	DZ-6	J19YD6	5/18/10	13.9	U	13.9	1.4	UD	1.4	1.4	UD	1.4	2.4	U	2.4	0.73	UR	0.73
12	DZ-7	J19YD7	5/18/10	6.28	J	13.8	1.38	UD	1.38	1.38	UD	1.38	2.6	U	2.6	0.79	UR	0.79
13	DZ-8	J19YD8	5/18/10	14	U	14	1.4	UD	1.4	1.4	UD	1.4	2.5	U	2.5	0.76	UR	0.76
14	DZ-9	J19YD9	5/18/10	13.4	U	13.4	1.34	UD	1.34	1.34	UD	1.34	2.4	U	2.4	0.73	UR	0.73
15	DZ-10	J19YF0	5/18/10	13.8	UJ	13.8	1.39	UD	1.39	1.39	UD	1.39	2.5	U	2.5	0.76	UR	0.76
16	DZ-11	J19YF1	5/18/10	14.1	U	14.1	1.41	UD	1.41	1.41	UD	1.41	2.5	U	2.5	0.76	U	0.76
17	DZ-12	J19YF2	5/18/10	13.7	U	13.7	1.37	UD	1.37	1.37	UD	1.37	2.9		2.3	0.70	U	0.70

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19 **Statistical Computations**

		Aroclor-1260		4,4'-DDD		4,4'-DDT		Chloride		Nitrogen in nitrite [b]	
20											
21	% < Detection limit	83%		92%		92%		75%		92%	
22	Maximum value	7.31		2.12		3.10		17.6		0.40	
23	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted**	17 ug/kg	GW & River Protection	3.3 ug/kg	River Protection	3.3 ug/kg	River Protection	25000	GW Protection	100	GW Protection
24	**3-PART TEST**										
25	Maximum > Cleanup Limit?	NO		NO		NO		NA		NO	
26	> 10% above Cleanup Limit?	NO		NO		NO		NA		NO	
27	Any sample > 2X Cleanup Limit?	NO		NO		NO		NA		NO	
28	**3-Part Test 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.		Because all values are below background (100 mg/kg) the 3-part test is not required.		The data set meets the 3-part test criteria when compared to the most stringent RAG.	

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CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 17 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Overburden**

	Sample Area	Sample Number	Sample Date	Carbon-14			Plutonium-238			Tritium			Uranium-233/234			Uranium-238		
4				pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
5	OB-5	J19YF8	5/13/10	0.663	U	0.866	0	U	0.269	1.61	U	2.42	0.517		0.172	0.427		0.172
6	Duplicate of J19YF8	J19YH6	5/13/10	0.910	U	0.933	0.030	U	0.230	1.88	U	2.60	0.579		0.201	0.526		0.201
7	OB-1	J19YF4	5/13/10	0.576	U	0.674	0.024	U	0.227	0.746	U	2.51	0.541		0.138	0.559		0.138
8	OB-2	J19YF5	5/13/10	0.872	U	0.968	0.267		0.227	2.93		2.68	0.494		0.169	0.459		0.135
9	OB-3	J19YF6	5/13/10	0.145	U	0.982	0	U	0.267	3.04		2.74	0.401		0.161	0.527		0.161
10	OB-4	J19YF7	5/13/10	1.54		0.920	0	U	0.332	3.61		2.67	0.598		0.148	0.444		0.148
11	OB-6	J19YF9	5/13/10	1.24		0.890	0	U	0.322	0.975	U	2.50	0.620		0.250	0.588		0.250
12	OB-7	J19YH0	5/13/10	1.24		0.917	0.0230	U	0.224	2.78		2.59	0.558		0.194	0.660		0.194
13	OB-8 re-sample 1[a]	J1FKL6	3/17/11	0	U	0.451	0.0395	U	0.148	0.00188	U	0.0264	0.138	U	0.177	0.186	U	0.191
14	OB-9	J19YH2	5/13/10	1.49		0.882	1.46		0.298	2.22	U	2.44	0.482		0.194	0.508		0.194
15	OB-10	J19YH3	5/13/10	1.02		0.904	0	U	0.180	2.61		2.56	0.632		0.186	0.292		0.186
16	OB-11	J19YH4	5/13/10	0.261	U	0.882	0	U	0.170	0.916	U	2.47	0.464		0.209	0.628		0.209
17	OB-12	J19YH5	5/13/10	0.430	U	0.943	0	U	0.185	0.680	U	2.62	0.760		0.224	0.731		0.224
18	OB-13	J1B4H9	5/17/10	0.051	U	0.513	0.037	U	0.282	0	U	7.04	0.495		0.223	0.524		0.223
19	OB-14	J1B4J0	5/17/10	0.063	U	0.511	0	U	0.262	0	U	7.68	0.778		0.161	0.421		0.161
20	OB-15	J1B4J1	5/17/10	0	U	0.526	0	U	0.242	0	U	7.28	0	U	0.046	0.013	U	0.032

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22 **Statistical Computation Input Data**

	Sample Area	Sample Number	Sample Date	Carbon-14 pCi/g	Plutonium-238 pCi/g	Tritium pCi/g	Uranium-233/234 pCi/g	Uranium-238 pCi/g
25	OB-5	J19YF8/ J19YH6	5/13/10	0.787	0.015	1.75	0.548	0.477
26	OB-1	J19YF4	5/13/10	0.576	0.024	0.746	0.541	0.559
27	OB-2	J19YF5	5/13/10	0.872	0.267	0	0.494	0.459
28	OB-3	J19YF6	5/13/10	0.145	0	3.04	0.401	0.527
29	OB-4	J19YF7	5/13/10	1.54	0	3.61	0.598	0.444
30	OB-6	J19YF9	5/13/10	1.24	0	0.975	0.620	0.588
31	OB-7	J19YH0	5/13/10	1.24	0.023	2.78	0.558	0.660
32	OB-8 re-sample 1[a]	J1FKL6	3/17/11	0	0.040	0.00188	0.138	0.186
33	OB-9	J19YH2	5/13/10	1.49	1.46	2.22	0.482	0.508
34	OB-10	J19YH3	5/13/10	1.02	0	2.61	0.632	0.292
35	OB-11	J19YH4	5/13/10	0.261	0	0.92	0.464	0.628
36	OB-12	J19YH5	5/13/10	0.430	0	0.680	0.760	0.731
37	OB-13	J1B4H9	5/17/10	0.0510	0.037	0	0.495	0.524
38	OB-14	J1B4J0	5/17/10	0.0630	0	0	0.778	0.421
39	OB-15	J1B4J1	5/17/10	0	0	0	0	0.0130

40 **Statistical Computations**

		Carbon-14	Plutonium-238	Tritium	Uranium-233/234	Uranium-238
42	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.
43	N	15	15	15	15	15
44	% < Detection limit	67%	87%	67%	13%	13%
45	Mean	0.628	0.108	0.0290	1.07	0.468
46	Standard deviation	0.561	0.376	1.27	0.205	0.186
47	Z-statistic	1.64	1.64	1.64	1.64	1.64
48	95% UCL on mean	0.866	0.268	0.570	1.16	0.547
49	Maximum value	1.54	0.267	3.61	0.778	0.731

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CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Job No. 14655

Calc. No. 0100H-CA-V0164
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Rev. No. 0
Date 05/17/11
Sheet No. 18 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Overburden**

3	Sample	Sample	Sample	Antimony			Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	OB-5	J19YF8	5/13/10	0.344	B	0.813	4.95		0.813	51.4		0.407	0.162	B	0.163	0.938	B	1.63	0.203	U	0.203	10.4		0.813	5.41		2.44
6	Duplicate of J19YF8	J19YH6	5/13/10	0.388	B	0.951	4.74		0.951	47.2		0.478	0.149	B	0.190	0.842	B	1.90	0.238	U	0.238	10.1		0.951	5.16		2.85
7	OB-1	J19YF4	5/13/10	0.377	B	0.722	3.27		0.722	50.9		0.361	0.153		0.144	0.853	B	1.44	0.180	U	0.180	13.2		0.722	5.37		2.17
8	OB-2	J19YF5	5/13/10	0.437	B	0.912	4.17		0.912	51.8		0.456	0.161	B	0.182	0.958	B	1.82	0.054	B	0.228	11.4		0.912	5.34		2.74
9	OB-3	J19YF6	5/13/10	0.464	B	0.854	6.21		0.854	47.8		0.427	0.169	B	0.171	0.916	B	1.71	0.213	U	0.213	10.7		0.854	5.52		2.56
10	OB-4	J19YF7	5/13/10	0.272	B	0.840	3.96		0.840	48.5		0.420	0.162	B	0.168	0.902	B	1.68	0.210	U	0.210	11.7		0.840	5.15		2.52
11	OB-6	J19YF9	5/13/10	0.426	B	0.869	8.14		0.869	54.4		0.434	0.197		0.174	1.17	B	1.74	0.070	B	0.217	11.7		0.869	5.80		2.61
12	OB-7	J19YH0	5/13/10	0.279	B	0.855	5.13		0.855	43.1		0.427	0.149	B	0.171	0.805	B	1.71	0.084	B	0.214	9.84		0.855	4.93		2.56
13	OB-8 re-sample 1*	J1FKL6	3/17/11	0.370	U	0.370	6.50		0.630	49.8	X	0.073	0.120	B	0.032	1.30	B	0.94	0.064	B	0.039	10.6	X	0.056	6.10	X	0.096
14	OB-9	J19YH2	5/13/10	0.773	U	0.773	3.59		0.773	48.7		0.386	0.136	B	0.155	0.752	B	1.55	0.193	U	0.193	9.58		0.773	4.95		2.32
15	OB-10	J19YH3	5/13/10	0.309	B	0.933	4.77		0.933	37.8		0.466	0.140	B	0.187	0.843	B	1.87	0.233	U	0.233	9.93		0.933	5.27		2.80
16	OB-11	J19YH4	5/13/10	0.491	B	0.854	6.82		0.854	67.6		0.427	0.208		0.171	1.34	B	1.71	0.064	B	0.214	12.8		0.854	5.88		2.56
17	OB-12	J19YH5	5/13/10	0.469	B	0.776	5.29		0.776	46.4		0.388	0.175		0.155	1.15	B	1.55	0.039	B	0.194	11.7		0.776	5.39		2.33
18	OB-13	J1B4H9	5/17/10	0.254	B	0.652	4.23		0.652	57.1		0.326	0.181		0.130	2.55		1.30	0.068	B	0.163	10.3		0.652	5.36		1.96
19	OB-14	J1B4J0	5/17/10	0.772	U	0.772	4.75		0.772	46.2		0.386	0.147	B	0.154	1.70		1.54	0.042	B	0.193	11.0		0.772	4.92		2.32
20	OB-15	J1B4J1	5/17/10	0.274	B	0.881	6.10		0.881	57.4		0.441	0.181		0.176	2.02		1.76	0.057	B	0.220	11.1		0.881	5.90		2.64

22 **Statistical Computation Input Data**

23	Sample	Sample	Sample	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt
24	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
25	OB-5	J19YF8/ J19YH6	5/13/10	0.366	4.85	49.3	0.156	0.890	0.110	10.3	5.29
26	OB-1	J19YF4	5/13/10	0.377	3.27	50.9	0.153	0.853	0.090	13.2	5.37
27	OB-2	J19YF5	5/13/10	0.437	4.17	51.8	0.161	0.958	0.054	11.4	5.34
28	OB-3	J19YF6	5/13/10	0.464	6.21	47.8	0.169	0.916	0.107	10.7	5.52
29	OB-4	J19YF7	5/13/10	0.272	3.96	48.5	0.162	0.902	0.105	11.7	5.15
30	OB-6	J19YF9	5/13/10	0.426	8.14	54.4	0.197	1.17	0.070	11.7	5.80
31	OB-7	J19YH0	5/13/10	0.279	5.13	43.1	0.149	0.805	0.084	9.84	4.93
32	OB-8 re-sample 1*	J1FKL6	3/17/11	0.185	6.50	49.8	0.120	1.30	0.064	10.6	6.10
33	OB-9	J19YH2	5/13/10	0.387	3.59	48.7	0.136	0.752	0.097	9.58	4.95
34	OB-10	J19YH3	5/13/10	0.309	4.77	37.8	0.140	0.843	0.117	9.93	5.27
35	OB-11	J19YH4	5/13/10	0.491	6.82	67.6	0.208	1.34	0.064	12.8	5.88
36	OB-12	J19YH5	5/13/10	0.469	5.29	46.4	0.175	1.15	0.039	11.7	5.39
37	OB-13	J1B4H9	5/17/10	0.254	4.23	57.1	0.181	2.55	0.068	10.3	5.36
38	OB-14	J1B4J0	5/17/10	0.386	4.75	46.2	0.147	1.70	0.042	11.0	4.92
39	OB-15	J1B4J1	5/17/10	0.274	6.10	57.4	0.181	2.02	0.057	11.1	5.90

40 **Statistical Computations**

41		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt
42	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), 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.
43	N	15	15	15	15	15	15	15	15
44	% < Detection limit	20%	0%	0%	0%	0%	40%	0%	0%
45	Mean	0.358	5.19	50.5	0.162	1.21	0.078	11.1	5.41
46	Standard deviation	0.092	1.34	6.9	0.023	0.51	0.025	1.05	0.37
47	95% UCL on mean	0.414	5.89	53.8	0.174	1.43	0.094	11.5	5.58
48	Maximum value	0.491	8.14	67.6	0.208	2.55	0.070	13.2	5.90
49	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	5 GW & River Protection	20 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	320 GW Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection
50	**WAC 173-340 3-PART TEST**								
51	95% UCL > Cleanup Limit?	NA	NO	NA	NA	NO	NA	NA	NA
52	> 10% above Cleanup Limit?	NA	NO	NA	NA	NO	NA	NA	NA
53	Any sample > 2X Cleanup Limit?	NA	NO	NA	NA	NO	NA	NA	NA
54	**WAC 173-340 Compliance?**	Because all values are below background (5 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 (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.

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CALCULATION SHEET

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Sheet No. 19 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Overburden**

3	Sample	Sample	Sample	Copper			Hexavalent chromium			Lead			Manganese			Molybdenum			Nickel			Vanadium			Zinc		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	OB-5	J19YF8	5/13/10	12.7		1.63	0.20	U	0.20	13.1		0.813	250		0.813	0.200	B	0.813	11.1		2.03	42.5		0.813	32.2		2.44
6	Duplicate of J19YF8	J19YH6	5/13/10	12.7		1.90	0.16	B	0.20	13.0		0.951	239		0.951	0.951	U	0.951	10.6		2.38	39.5		0.951	31.2		2.85
7	OB-1	J19YF4	5/13/10	13.5		1.44	0.15	B	0.20	6.95		0.722	266		0.722	0.250	B	0.722	10.9		1.80	41.7		0.722	32.8		2.17
8	OB-2	J19YF5	5/13/10	14.3		1.82	0.11	B	0.20	10.3		0.912	259		0.912	0.352	B	0.912	11.0		2.28	46.4		0.912	41.2		2.74
9	OB-3	J19YF6	5/13/10	13.5		1.71	0.18	B	0.20	17.6		0.854	251		0.854	0.232	B	0.854	10.1		2.13	45.3		0.854	33.3		2.56
10	OB-4	J19YF7	5/13/10	13.8		1.68	0.15	B	0.20	7.44		0.840	256		0.840	0.276	B	0.840	10.5		2.10	43.6		0.840	33.2		2.52
11	OB-6	J19YF9	5/13/10	13.2		1.74	0.14	B	0.20	25.2		0.869	272		0.869	0.313	B	0.869	9.82		2.17	46.5		0.869	39.0		2.61
12	OB-7	J19YH0	5/13/10	13.4		1.71	0.20	B	0.20	16.8		0.855	220		0.855	0.227	B	0.855	9.49		2.14	38.8		0.855	55.3		2.56
13	OB-8 re-sample 1*	J1FKL6	3/17/11	13.6		0.21	0.184		0.154	17.9	X	0.26	253	X	0.096	0.250	U	0.250	10.3	X	0.12	42.1		0.090	34.3	X	0.38
14	OB-9	J19YH2	5/13/10	11.7		1.55	0.12	B	0.20	8.91		0.773	224		0.773	0.167	B	0.773	8.89		1.93	41.5		0.773	30.1		2.32
15	OB-10	J19YH3	5/13/10	12.4		1.87	0.17	B	0.20	11.3		0.933	244		0.933	0.933	U	0.933	9.11		2.33	39.4		0.933	29.4		2.80
16	OB-11	J19YH4	5/13/10	14.5		1.71	0.15	B	0.20	22.4		0.854	276		0.854	0.199	B	0.854	11.6		2.14	45.5		0.854	44.4		2.56
17	OB-12	J19YH5	5/13/10	13.4		1.55	0.11	B	0.20	14.0		0.776	248		0.776	0.209	B	0.776	11.9		1.94	44.8		0.776	33.1		2.33
18	OB-13	J1B4H9	5/17/10	12.9		1.30	0.20	U	0.20	10.5		0.652	250		0.652	0.272	B	0.652	9.50		1.63	45.1		0.652	59.6		1.96
19	OB-14	J1B4J0	5/17/10	12.2		1.54	0.20	U	0.20	12.3		0.772	227		0.772	0.308	B	0.772	9.29		1.93	42.1		0.772	37.0		2.32
20	OB-15	J1B4J1	5/17/10	13.6		1.76	0.20	U	0.20	14.3		0.881	262		0.881	0.289	B	0.881	11.8		2.2	44.9		0.881	49.4		2.64

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22 **Statistical Computation Input Data**

23	Sample	Sample	Sample	Copper	Hexavalent chromium	Lead	Manganese	Molybdenum	Nickel	Vanadium	Zinc
24	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
25	OB-5	J19YF8/ J19YH6	5/13/10	12.7	0.13	13.1	245	0.338	10.9	41.0	31.7
26	OB-1	J19YF4	5/13/10	13.5	0.15	7.0	266	0.250	10.9	41.7	32.8
27	OB-2	J19YF5	5/13/10	14.3	0.11	10.3	259	0.352	11.0	46.4	41.2
28	OB-3	J19YF6	5/13/10	13.5	0.18	17.6	251	0.232	10.1	45.3	33.3
29	OB-4	J19YF7	5/13/10	13.8	0.15	7.44	256	0.276	10.5	43.6	33.2
30	OB-6	J19YF9	5/13/10	13.2	0.14	25.2	272	0.313	9.82	46.5	39.0
31	OB-7	J19YH0	5/13/10	13.4	0.20	16.8	220	0.227	9.49	38.8	55.3
32	OB-8 re-sample 1*	J1FKL6	3/17/11	13.6	0.18	17.9	253	0.125	10.3	42.1	34.3
33	OB-9	J19YH2	5/13/10	11.7	0.12	8.91	224	0.167	8.89	41.5	30.1
34	OB-10	J19YH3	5/13/10	12.4	0.17	11.3	244	0.467	9.11	39.4	29.4
35	OB-11	J19YH4	5/13/10	14.5	0.15	22.4	276	0.199	11.6	45.5	44.4
36	OB-12	J19YH5	5/13/10	13.4	0.11	14.0	248	0.209	11.9	44.8	33.1
37	OB-13	J1B4H9	5/17/10	12.9	0.10	10.5	250	0.272	9.50	45.1	59.6
38	OB-14	J1B4J0	5/17/10	12.2	0.10	12.3	227	0.308	9.29	42.1	37.0
39	OB-15	J1B4J1	5/17/10	13.6	0.10	14.3	262	0.289	11.8	44.9	49.4

40 **Statistical Computations**

41		Copper	Hexavalent chromium	Lead	Manganese	Molybdenum	Nickel	Vanadium	Zinc
42	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), 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.
43	N	15	15	15	15	15	15	15	15
44	% < Detection limit	0%	20%	0%	0%	13%	0%	0%	0%
45	Mean	13.2	0.14	13.9	250	0.268	10.3	43.2	38.9
46	Standard deviation	0.8	0.033	5.3	16.6	0.084	0.99	2.48	9.34
47	95% UCL on mean	13.6	0.16	17.0	258	0.318	10.8	44.4	43.4
48	Maximum value	14.5	0.20	25.2	276	0.313	11.9	46.5	59.6
49	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	22.0 River Protection	2 River Protection	10.2 GW & River Protection	512 GW & River Protection	8 GW Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection
50	**WAC 173-340 3-PART TEST**								
51	95% UCL > Cleanup Limit?	NA	NO	YES	NA	NO	NA	NA	NA
52	> 10% above Cleanup Limit?	NA	NO	YES	NA	NO	NA	NA	NA
53	Any sample > 2X Cleanup Limit?	NA	NO	YES	NA	NO	NA	NA	NA
54	**WAC 173-340 Compliance?**	Because all values are below background (22.0 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.	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 (512 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 (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.

55

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 20 of 47

1 116-H-5 Statistical Calculations
2 Verification Data -Overburden

3	Sample	Sample	Sample	Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene			Benzo(ghi)perylene			Benzo(k)fluoranthene			Chrysene			Dibenz[a,h]anthracene			Fluoranthene		
4	Area	Number	Date	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	ug/kg	Q	PQL
5	OB-5	J19YF8	5/13/10	5.88		3.25	7.38		3.25	8.77		3.25	4.89		3.25	3.72		3.25	3.77		3.25	0.894	J	3.25	21		3.25
6	Duplicate of J19YF8	J19YH6	5/13/10	4.07		3.25	4.25		3.25	7.52		3.25	3.03	J	3.25	2.31	J	3.25	1.17	J	3.25	3.25	U	3.25	9.18		3.25
7	OB-1	J19YF4	5/13/10	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.98		3.35
8	OB-2	J19YF5	5/13/10	3.26	U	3.26	1.24	J	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	1.39	J	3.26
9	OB-3	J19YF6	5/13/10	0.974	J	3.35	1.7	J	3.35	1.44	J	3.35	1.56	J	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	6.45		3.35
10	OB-4	J19YF7	5/13/10	0.919	J	3.28	1.44	J	3.28	1.07	J	3.28	0.837	J	3.28	3.28	U	3.28	1.46	J	3.28	3.28	U	3.28	6.55		3.28
11	OB-6	J19YF9	5/13/10	4.65		3.24	7.63		3.24	9.71		3.24	9.53		3.24	3.92		3.24	5.51		3.24	1.43	J	3.24	15.3		3.24
12	OB-7	J19YH0	5/13/10	55.5		3.34	68.8		3.34	71.0		3.34	36.8		3.34	30.4		3.34	39.9		3.34	8.73		3.34	161		3.34
13	OB-8 re-sample 1[a]	J1FKL6	3/17/11	18		3.3	17		6.6	18		4.3	7.4	U	7.4	9.20	J	4.1	16.0	J	5.0	11	U	11	13.0	U	13.0
14	OB-9	J19YH2	5/13/10	94.5		3.25	85.3		3.25	84.1		3.25	64.5		3.25	43.5		3.25	160		3.25	19.0		3.25	269		3.25
15	OB-10	J19YH3	5/13/10	13.3		3.32	11.9		3.32	11.7		3.32	9.20		3.32	6.08		3.32	34.1		3.32	2.49	J	3.32	29.1		3.32
16	OB-11	J19YH4	5/13/10	21.3		3.18	57.4		3.18	53.5		3.18	98.0		3.18	22.1		3.18	17.3		3.18	10.8		3.18	54.6		3.18
17	OB-12	J19YH5	5/13/10	13.7		3.36	12.8		3.36	17		3.36	9.28		3.36	6.11		3.36	23.7		3.36	1.6	J	3.36	29.5		3.36
18	OB-13	J1B4H9	5/17/10	10.2		3.33	7.41		3.33	15.4		3.33	4.4		3.33	3.40		3.33	18.7		3.33	3.33	U	3.33	24.6		3.33
19	OB-14	J1B4J0	5/17/10	6.98		3.33	5.72		3.33	8.78		3.33	4.07		3.33	2.53	J	3.33	8.23		3.33	3.33	U	3.33	17.9		3.33
20	OB-15	J1B4J1	5/17/10	22.3		3.34	18.9		3.34	27.5		3.34	11.6		3.34	7.86		3.34	32.5		3.34	1.49	J	3.34	65.9		3.34

21
22 Statistical Computation Input Data

23	Sample	Sample	Sample	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz[a,h]anthracene	Fluoranthene
24	Area	Number	Date	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
25	OB-5	J19YF8/ J19YH6	5/13/10	5.0	5.82	8.15	3.96	3.02	2.47	1.26	15.1
26	OB-1	J19YF4	5/13/10	1.7	1.68	1.68	1.68	1.68	1.68	1.7	3.98
27	OB-2	J19YF5	5/13/10	1.6	1.24	1.63	1.63	1.63	1.63	1.6	1.39
28	OB-3	J19YF6	5/13/10	1.0	1.70	1.44	1.56	1.68	1.68	1.7	6.45
29	OB-4	J19YF7	5/13/10	0.9	1.44	1.07	0.84	1.64	1.46	1.6	6.55
30	OB-6	J19YF9	5/13/10	4.7	7.63	9.71	9.53	3.92	5.51	1.4	15.3
31	OB-7	J19YH0	5/13/10	55.5	68.8	71.0	36.8	30.4	39.9	8.7	161
32	OB-8 re-sample 1[a]	J1FKL6	3/17/11	18.0	17.0	18.0	3.70	9.20	16.0	5.5	6.50
33	OB-9	J19YH2	5/13/10	94.5	85.3	84.1	64.5	43.5	160.0	19.0	269
34	OB-10	J19YH3	5/13/10	13.3	11.9	11.7	9.20	6.08	34.1	2.5	29.1
35	OB-11	J19YH4	5/13/10	21.3	57.4	53.5	98.0	22.1	17.3	10.8	54.6
36	OB-12	J19YH5	5/13/10	13.7	12.8	17.0	9.28	6.11	23.7	1.6	29.5
37	OB-13	J1B4H9	5/17/10	10.2	7.41	15.4	4.40	3.40	18.7	1.7	24.6
38	OB-14	J1B4J0	5/17/10	7.0	5.72	8.78	4.07	2.53	8.23	1.7	17.9
39	OB-15	J1B4J1	5/17/10	22.3	18.9	27.5	11.6	7.86	32.5	1.5	65.9

40 Statistical Computations

41		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz[a,h]anthracene	Fluoranthene
42	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), 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.
43	N	15	15	15	15	15	15	15	15
44	% < Detection limit	13%	7%	13%	20%	27%	20%	47%	7%
45	Mean	18.0	20.3	22.0	17.4	9.6	24.3	4.15	47.1
46	Standard deviation	25.3	27.1	26.3	28.1	12.5	39.7	5.05	73.5
47	95% UCL on mean	78.5	83.1	105	62.9	21.9	113	6.29	188
48	Maximum value	94.5	85.3	84.1	98.0	43.5	160	19.0	269
49	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	48000 ug/kg GW & River Protection	15 ug/kg GW & River Protection	100 ug/kg GW & River Protection	30 ug/kg GW & River Protection	18000 ug/kg River Protection
50	WAC 173-340 3-PART TEST								
51	95% UCL > Cleanup Limit?	YES	YES	YES	NO	YES	YES	NO	NO
52	> 10% above Cleanup Limit?	YES	YES	YES	NO	YES	NO	NO	NO
53	Any sample > 2X Cleanup Limit?	YES	YES	YES	NO	YES	NO	NO	NO
54	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.	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.	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.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 21 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Overburden**

3	Sample	Sample	Sample	Indeno(1,2,3-cd)pyrene			Phenanthrene			Pyrene			Fluoride			Nitrogen in nitrate [b]			Nitrogen in nitrate and nitrite			Sulfate		
4	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	OB-5	J19YF8	5/13/10	5.72		3.25	6.78		3.25	17.2		3.25	0.8	B	2.5	0.70		0.56	0.66		0.20	5.6		2.5
6	Duplicate of J19YF8	J19YH6	5/13/10	4.02		3.25	3.08	J	3.25	7.13		3.25	0.5	B	2.5	0.81		0.56	0.75		0.20	6.2		2.5
7	OB-1	J19YF4	5/13/10	0.839	J	3.35	1.31	J	3.35	1.44	J	3.35	0.7	B	2.5	0.56	U	0.56	0.56		0.20	2.9		2.5
8	OB-2	J19YF5	5/13/10	1.08	J	3.26	1.19	J	3.26	1.27	J	3.26	0.7	B	2.3	0.52	U	0.52	0.34		0.19	6.4		2.3
9	OB-3	J19YF6	5/13/10	1.56	J	3.35	1.38	J	3.35	3.14	J	3.35	0.7	B	2.4	1.29		0.54	1.41		0.19	6.6		2.4
10	OB-4	J19YF7	5/13/10	1.18	J	3.28	1.61	J	3.28	2.38	J	3.28	0.6	B	2.2	0.52		0.50	0.55		0.20	4.3		2.2
11	OB-6	J19YF9	5/13/10	7.89		3.24	4.49		3.24	9.13		3.24	0.8	B	2.3	1.60		0.52	1.25		0.21	14.2		2.3
12	OB-7	J19YH0	5/13/10	42.4		3.34	86.9		3.34	176		3.34	0.8	B	2.5	0.56	U	0.56	1.30		0.18	8.8		2.5
13	OB-8 re-sample 1[a]	J1FKL6	3/17/11	14.0	J	12.0	15.0	J	12.0	34.0	J	12.0	1.1	B	0.88	0.96	B	0.33	0.79	B	0.38	6.9		1.8
14	OB-9	J19YH2	5/13/10	71.3		3.25	201		3.25	290		3.25	0.7	B	2.4	0.52	B	0.54	0.66		0.19	3.0		2.4
15	OB-10	J19YH3	5/13/10	12.8		3.32	11.3		3.32	39.6		3.32	0.6	B	2.4	2.51		0.54	2.49		0.19	7.7		2.4
16	OB-11	J19YH4	5/13/10	68.8		3.18	14.1		3.18	51.9		3.18	1.0	B	2.5	0.90		0.56	0.99		0.18	7.4		2.5
17	OB-12	J19YH5	5/13/10	9.37		3.36	10.4		3.36	28.7		3.36	0.7	B	2.4	0.86		0.54	0.95		0.22	3.8		2.4
18	OB-13	J1B4H9	5/17/10	8.95		3.33	7.35		3.33	18.3		3.33	0.5	B	2.3	5.08		0.52	4.61		0.20	6.4		2.3
19	OB-14	J1B4J0	5/17/10	5.05		3.33	6.48		3.33	13.8		3.33	0.7	B	2.3	3.10		0.52	3.01		0.20	5.4		2.3
20	OB-15	J1B4J1	5/17/10	16.5		3.34	26.8		3.34	49.6		3.34	0.3	B	2.2	3.23		0.50	2.85		0.19	8.0		2.2

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22 **Statistical Computation Input Data**

23	Sample	Sample	Sample	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Fluoride	Nitrogen in nitrate [b]	Nitrogen in nitrate and nitrite	Sulfate
24	Area	Number	Date	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg
25	OB-5	J19YF8/ J19YH6	5/13/10	4.87	4.93	12.2	0.7	0.76	0.71	5.9
26	OB-1	J19YF4	5/13/10	0.84	1.31	1.4	0.7	0.28	0.56	2.9
27	OB-2	J19YF5	5/13/10	1.08	1.19	1.3	0.7	0.26	0.34	6.4
28	OB-3	J19YF6	5/13/10	1.56	1.38	3.1	0.7	1.29	1.41	6.6
29	OB-4	J19YF7	5/13/10	1.18	1.61	2.4	0.6	0.52	0.55	4.3
30	OB-6	J19YF9	5/13/10	7.89	4.49	9.1	0.8	1.60	1.25	14.2
31	OB-7	J19YH0	5/13/10	42.4	86.9	176	0.8	0.28	1.30	8.8
32	OB-8 re-sample 1[a]	J1FKL6	3/17/11	14.0	15.0	34.0	1.1	0.96	0.79	6.9
33	OB-9	J19YH2	5/13/10	71.3	201	290	0.7	0.52	0.66	3.0
34	OB-10	J19YH3	5/13/10	12.8	11.3	39.6	0.6	2.51	2.49	7.7
35	OB-11	J19YH4	5/13/10	68.8	14.1	51.9	1.0	0.90	0.99	7.4
36	OB-12	J19YH5	5/13/10	9.37	10.4	28.7	0.7	0.86	0.95	3.8
37	OB-13	J1B4H9	5/17/10	8.95	7.35	18.3	0.5	5.08	4.61	6.4
38	OB-14	J1B4J0	5/17/10	5.05	6.48	13.8	0.7	3.10	3.01	5.4
39	OB-15	J1B4J1	5/17/10	16.5	26.8	49.6	0.3	3.23	2.85	8.0

40 **Statistical Computations**

41		Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Fluoride	Nitrogen in nitrate [b]	Nitrogen in nitrate and nitrite	Sulfate
42	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), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
43	N	15	15	15	15	15	15	15
44	% < Detection limit	0%	0%	0%	0%	20%	0%	0%
45	Mean	17.8	26.3	48.8	0.7	1.5	1.5	6.5
46	Standard deviation	23.6	52.9	79.7	0.2	1.4	1.2	2.8
47	95% UCL on mean	83.4	107	342	0.8	3.0	2.4	8.2
48	Maximum value	71.3	201	290	1.1	5.1	4.6	14.2
49	Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise	330 ug/kg GW & River Protection	240000 ug/kg GW Protection	48000 ug/kg GW Protection	96 GW Protection	1000 GW Protection	1000 GW Protection	25000 GW Protection
50	WAC 173-340 3-PART TEST							
51	95% UCL > Cleanup Limit?	NO	NO	NO	NA	NA	NA	NA
52	> 10% above Cleanup Limit?	NO	NO	NO	NA	NA	NA	NA
53	Any sample > 2X Cleanup Limit?	NO	NO	NO	NA	NA	NA	NA
54	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.	Because all values are below background (2.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (11.8 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (11.8 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (237 mg/kg) the WAC 173-340 3-part test is not required.

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MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 22 of 47

1 **116-H-5 Maximum Calculations**
2 **Verification Data -Overburden**

3	Sample	Sample	Sample	Silver			Bis(2-ethylhexyl)phthalate			Naphthalene			Acenaphthene			Anthracene			Fluorene			4,4'-DDE			Chloride			TPH-diesel range			TPH-diesel range EXT			TPH-motor oil (high boiling)		
4	Area	Number	Date	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	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	OB-5	J19YF8	5/13/10	0.813	U	0.813	331	U	331	3.25	U	3.25	3.25	U	3.25	1.66	J	3.25	3.25	U	3.25	1.33	UD	1.33	2.5	U	2.5	3360	U	3360				10100	U	10100
6	Duplicate of J19YF8	J19YH6	5/13/10	0.951	U	0.951	330	U	330	3.25	U	3.25	3.25	U	3.25	3.25	U	3.25	3.25	U	3.25	1.32	UD	1.32	2.5	U	2.5	3350	U	3350				10000	U	10000
7	OB-1	J19YF4	5/13/10	0.722	U	0.722	333	U	333	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	1.34	UD	1.34	20.6		2.5	3350	U	3350				10100	U	10100
8	OB-2	J19YF5	5/13/10	0.912	U	0.912	324	U	324	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	3.26	U	3.26	1.33	UD	1.33	2.3	U	2.3	3330	U	3330				9980	U	9980
9	OB-3	J19YF6	5/13/10	0.854	U	0.854	330	U	330	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	3.35	U	3.35	1.32	UD	1.32	2.4	U	2.4	3340	U	3340				10000	U	10000
10	OB-4	J19YF7	5/13/10	0.840	U	0.840	331	U	331	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	3.28	U	3.28	1.33	UD	1.33	3.6		2.2	3360	U	3360				10100	U	10100
11	OB-6	J19YF9	5/13/10	0.869	U	0.869	329	U	329	3.24	U	3.24	3.24	U	3.24	3.24	U	3.24	3.24	U	3.24	1.34	UD	1.34	2.3	U	2.3	3330	U	3330				5970	J	10000
12	OB-7	J19YH0	5/13/10	0.855	U	0.855	323	U	323	3.34	U	3.34	3.34	U	3.34	37.5		3.34	4.38		3.34	1.33	UD	1.33	6.9		2.5	3300	U	3300				9900	U	9900
13	OB-8 re-sample 1[a]	J1FKL6	3/17/11	0.150	U	0.150	120	JB	48	12.0	U	12.0	10.0	U	10.0	3.10	U	3.10	5.40	U	5.40	0.45	JX	0.25	2.8	B	2.1	3200	J	720	6500		1100	8510	J	10100
14	OB-9	J19YH2	5/13/10	0.773	U	0.773	331	U	331	3.25	U	3.25	21.9		3.25	58.4		3.25	32.3		3.25	1.34	UD	1.34	2.4	U	2.4	3340	U	3340				10000	U	10000
15	OB-10	J19YH3	5/13/10	0.933	U	0.933	331	U	331	3.32	U	3.32	3.32	U	3.32	1.88	J	3.32	1.36	J	3.32	1.32	UD	1.32	2.4	U	2.4	3340	U	3340				10000	U	10000
16	OB-11	J19YH4	5/13/10	0.854	U	0.854	333	U	333	3.18	U	3.18	7.10		3.18	2.43	J	3.18	1.11	J	3.18	1.32	UD	1.32	2.5	U	2.5	3340	U	3340				15000		10000
17	OB-12	J19YH5	5/13/10	0.776	U	0.776	328	U	328	3.36	U	3.36	3.36	U	3.36	1.41	J	3.36	3.36	U	3.36	1.34	UD	1.34	2.4	U	2.4	3340	U	3340				10000	U	10000
18	OB-13	J1B4H9	5/17/10	0.138	B	0.652	331	U	331	25.1		3.33	7.96		3.33	3.33	U	3.33	3.33	U	3.33	1.33	UD	1.33	2.3	U	2.3	3360	U	3360				11500		10100
19	OB-14	J1B4J0	5/17/10	0.156	B	0.772	328	U	328	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	3.33	U	3.33	1.33	UD	1.33	2.3	U	2.3	3310	U	3310				6810	J	9930
20	OB-15	J1B4J1	5/17/10	0.881	U	0.881	331	U	331	3.34	U	3.34	3.34	U	3.34	2.59	J	3.34	1.71	J	3.34	1.34	UD	1.34	2.2	U	2.2	3340	U	3340				8950	J	10000

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22 **Statistical Computations**

23		Silver			Bis(2-ethylhexyl)phthalate			Naphthalene			Acenaphthene			Anthracene			Fluorene			4,4'-DDE			Chloride			TPH-diesel range			TPH-diesel range EXT			TPH-motor oil (high boiling)		
24	% < Detection limit	87%			93%			93%			80%			53%			67%			93%			73%			93%			0%			60%		
25	Maximum value	0.156			120			25.1			21.9			58.4			32.3			0.45			20.6			3200			6500			15000		
26	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted**	0.73	River Protection		360 ug/kg	River Protection		16000 ug/kg	GW Protection		96000 ug/kg	GW Protection		240000 ug/kg	GW Protection		64000 ug/kg	GW Protection		3.3 ug/kg	River Protection		25000	GW Protection		200000 ug/kg	DE, GW & River Protection		200000 ug/kg	DE, GW & River Protection		200000 ug/kg	DE, GW & River Protection	
27	**3-PART TEST**																																			
28	Maximum > Cleanup Limit?	NA			NO			NO			NO			NO			NO			NO			NA			NO			NO			NO		
29	> 10% above Cleanup Limit?	NA			NO			NO			NO			NO			NO			NO			NA			NO			NO			NO		
30	Any sample > 2X Cleanup Limit?	NA			NO			NO			NO			NO			NO			NO			NA			NO			NO			NO		
31	**3-Part Test Compliance?**	Because all values are below background (0.73 mg/kg) the 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.			Because all values are below background (100 mg/kg) the 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.		

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 23 of 47

1 **116-H-5 Statistical Calculations**
2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Cesium-137			Technetium-99			Uranium-233/234			Uranium-238		
4	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
5	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0	U	0.0804	0.165	U	0.607	0.127		0.120	0.0772	U	0.101
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.0326	U	0.0608	0.177	U	0.626	0.0580	U	0.139	0.236		0.163
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.0180	U	0.0258	0.403	U	0.625	0.218		0.142	0.174		0.135
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0	U	0.0341	0.288	U	0.624	0.043	U	0.105	0.115		0.0873
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0	U	0.0262	0.520	U	0.617	0.162		0.0870	0.160		0.0970
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.0528	U	0.0969	0.397	U	0.621	0.138		0.130	0.0244	U	0.126
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.0515	U	0.0571	0.256	U	0.618	0.141	U	0.154	0.132	U	0.180
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.0679		0.0285	0.439	U	0.650	0.0757	U	0.147	0.130	U	0.153
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0	U	0.0279	0.485	U	0.615	0.207		0.119	0.183		0.0988
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0	U	0.0322	0.237	U	0.645	0.453		0.106	0.224		0.114
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0	U	0.0312	0.427	U	0.633	0.187		0.100	0.211		0.112
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0	U	0.0343	0.575	U	0.615	0.141		0.111	0.0711	U	0.0931
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.0167	U	0.0248	0.809		0.656	0.0717	U	0.178	0.189		0.173

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Cesium-137	Technetium-99	Uranium-233/234	Uranium-238
21	Area	Number	Date	pCi/g	pCi/g	pCi/g	pCi/g
22	SPA-4 re-sample 1[a]	J1FKM0/ J1FKM9	3/17/11	0.0163	0.171	0.0925	0.157
23	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.0180	0.403	0	0
24	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0	0.288	0	0.115
25	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0	0.520	0.162	0.160
26	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.0528	0.397	0.138	0.0244
27	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.0515	0.256	0	0.132
28	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.0679	0.439	0.0757	0.130
29	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0	0.485	0.207	0
30	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0	0.237	0.453	0.224
31	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0	0.427	0.187	0.211
32	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0	0.575	0	0.0711
33	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.0167	0.809	0.0717	0.189

34 **Statistical Computations**

35		Cesium-137	Technetium-99	Uranium-233/234	Uranium-238
36	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.
37	N	12	12	12	12
38	% < Detection limit	92%	92%	33%	33%
39	Mean	0.0127	0.417	0.0290	1.07
40	Standard deviation	0.0248	0.173	0.112	0.0575
41	Z-statistic	1.64	1.64	1.64	1.64
42	95% UCL on mean	0.0245	0.499	0.0822	1.10
43	Maximum value	0.0679	0.809	0.453	0.236

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 24 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead			Manganese		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	1.7		0.58	32.9	X	0.067	0.085	B	0.029	0.86	U	0.86	0.054	B	0.036	8.8	X	0.051	4.9	X	0.088	12.3		0.19	2.7	X	0.24	222	X	0.088
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	2.1		0.69	36.4	X	0.079	0.074	B	0.034	1.0	U	1.0	0.079	B	0.043	9.6	X	0.060	5.1	X	0.10	11.4		0.23	2.4	X	0.28	225	X	0.10
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	2.2		0.59	36.4	X	0.067	0.089	B	0.029	0.88	B	0.87	0.043	B	0.036	9.2	X	0.051	4.9	X	0.089	11.3		0.19	2.0	X	0.24	218	X	0.089
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	1.7		0.64	33.5	X	0.074	0.079	B	0.032	0.95	U	0.95	0.049	B	0.040	9.4	X	0.056	5.2	X	0.097	12.1		0.21	2.1	X	0.26	231	X	0.097
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	1.5		0.57	37.3	X	0.066	0.069	B	0.029	0.85	U	0.85	0.077	B	0.036	6.1	X	0.050	4.5	X	0.087	12.5		0.19	2.3	X	0.23	182	X	0.087
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	7.8		0.58	88.8	X	0.067	0.15	B	0.029	6.9		0.87	0.15	B	0.036	11.0	X	0.051	6.3	X	0.088	15.9		0.19	30.7	X	0.24	254	X	0.088
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	9.1		0.59	60.5	X	0.068	0.15	B	0.030	2.1		0.88	0.11	B	0.037	9.6	X	0.052	6.0	X	0.090	13.5		0.19	35.3	X	0.24	252	X	0.090
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	14.1		0.69	126	X	0.079	0.17	B	0.034	1.7	B	1.0	0.12	B	0.043	11.9	X	0.061	7.2	X	0.10	15.6		0.23	70.5	X	0.28	300	X	0.10
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	6.7		0.70	68.3	X	0.080	0.10	B	0.035	1.2	B	1.0	0.10	B	0.043	10.5	X	0.061	7.2	X	0.11	17.0		0.23	20.0	X	0.29	286	X	0.11
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	12.2		0.67	82.9	X	0.077	0.22		0.033	1.4	B	0.99	0.14	B	0.041	13.1	X	0.058	7.9	X	0.10	14.9		0.22	32.7	X	0.27	362	X	0.10
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	3.4		0.65	40.6	X	0.075	0.047	B	0.032	0.96	U	0.96	0.059	B	0.040	9.4	X	0.057	6.7	X	0.098	14.0		0.21	5.5	X	0.27	230	X	0.098
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	2.2		0.56	43.0	X	0.065	0.028	B	0.028	0.84	U	0.84	0.077	B	0.035	9.4	X	0.050	6.8	X	0.086	12.9		0.19	2.3	X	0.23	241	X	0.086
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	14.2		0.59	72.5	X	0.068	0.16	B	0.030	1.8		0.88	0.12	B	0.037	11.6	X	0.052	6.8	X	0.090	14.0		0.20	58.5	X	0.24	294	X	0.090

19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
22	SPA-4 re-sample 1[a]	J1FKM0/ J1FKM9	3/17/11	1.9	34.7	0.080	0.47	0.067	9.2	5.0	11.9	2.55	224
23	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	2.2	36.4	0.089	0.88	0.043	9.2	4.9	11.3	2.00	218
24	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	1.7	33.5	0.079	0.48	0.049	9.4	5.2	12.1	2.10	231
25	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	1.5	37.3	0.069	0.43	0.077	6.1	4.5	12.5	2.30	182
26	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	7.8	88.8	0.15	6.9	0.15	11.0	6.3	15.9	30.7	254
27	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	9.1	60.5	0.15	2.1	0.11	9.6	6.0	13.5	35.3	252
28	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	14.1	126	0.17	1.7	0.12	11.9	7.2	15.6	70.5	300
29	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	6.7	68.3	0.10	1.2	0.10	10.5	7.2	17.0	20.0	286
30	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	12.2	82.9	0.22	1.4	0.14	13.1	7.9	14.9	32.7	362
31	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	3.4	40.6	0.047	0.48	0.059	9.4	6.7	14.0	5.50	230
32	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	2.2	43.0	0.028	0.42	0.077	9.4	6.8	12.9	2.30	241
33	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	14.2	72.5	0.16	1.8	0.12	11.6	6.8	14.0	58.5	294

34 **Statistical Computations**

35		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
36	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), 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), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.
37	N	12	12	12	12	12	12	12	12	12	12
38	% < Detection limit	0%	0%	0%	42%	0%	0%	0%	0%	0%	0%
39	Mean	6.4	60.4	0.11	1.5	0.093	10.0	6.2	13.8	22.0	256
40	Standard deviation	5.0	28.6	0.057	1.8	0.036	1.8	1.1	1.78	23.9	48
41	95% UCL on mean	14.0	80.0	0.17	2.4	0.12	11.0	6.9	14.8	33.4	283
42	Maximum value	14.2	126	0.22	6.9	0.15	13.1	7.9	17.0	70.5	362
43	**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
44	**WAC 173-340 3-PART TEST**										
45	95% UCL > Cleanup Limit?	NO	NA	NA	NO	NA	NA	NA	NA	YES	NA
46	> 10% above Cleanup Limit?	NO	NA	NA	NO	NA	NA	NA	NA	YES	NA
47	Any sample > 2X Cleanup Limit?	NO	NA	NA	NO	NA	NA	NA	NA	YES	NA
48	**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 (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.	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 (512 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 25 of 47

1 **116-H-5 Statistical Calculations**
2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Nickel			Vanadium			Zinc			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene			Benzo(k)fluoranthene			Chrysene			Indeno(1,2,3-cd)pyrene			Phenanthrene		
4	Area	Number	Date	mg/kg	Q	PQL	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	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	8.3	X	0.11	35.8		0.083	28.4	X	0.35	230		3.1	170		6.2	190		4.1	87		3.8	160		4.7	120		12	240		12
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	10.3	X	0.13	38.0		0.098	28.1	X	0.41	170		3.1	120		6.2	140		4.0	69		3.8	140		4.6	110		12	130		12
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	9.4	X	0.11	36.8		0.083	26.4	X	0.35	3.3	U	3.3	6.6	U	6.6	4.3	U	4.3	4.1	U	4.1	5.0	U	5.0	12	U	12	12	U	12
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	10.5	X	0.12	38.4		0.091	27.9	X	0.39	3.3	U	3.3	6.8	J	6.6	4.3	U	4.3	4.1	U	4.1	5.0	U	5.0	12	U	12	12	U	12
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	7.0	X	0.11	36.4		0.081	25.7	X	0.35	25	X	3.1	17		6.2	20		4.1	11	JX	3.8	27	J	4.7	12	J	12	13	J	12
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	10.8	X	0.11	41.1		0.083	40.6	X	0.35	19		3.1	22		6.2	25		4.1	9.8	J	3.8	21	J	4.7	16	J	12	12	U	12
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	9.5	X	0.11	36.1		0.084	36.4	X	0.36	21		3.3	27		6.6	20		4.3	10	J	4.1	24	J	5.0	21	J	12	19	J	12
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	11.2	X	0.13	46.4		0.098	44.8	X	0.42	22		3.2	37		6.5	20		4.2	8.9	J	4.0	26	J	4.9	17	J	12	17	J	12
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	9.7	X	0.13	59.2		0.099	44.6	X	0.42	31		3.3	25		6.6	21		4.3	9.7	J	4.0	29	J	5.0	20	J	12	32	J	12
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	12.8	X	0.12	45.4		0.095	48.6	X	0.40	8.9	J	3.5	9.6	J	6.9	4.5	U	4.5	4.3	U	4.3	8.7	J	5.2	13	U	13	13	U	13
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	10.2	X	0.12	49.8		0.092	32.8	X	0.39	3.1	U	3.1	6.3	U	6.3	4.1	U	4.1	3.8	U	3.8	4.7	U	4.7	12	U	12	12	U	12
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	8.0	X	0.11	53.3		0.080	32.9	X	0.34	3.2	U	3.2	6.5	U	6.5	4.3	U	4.3	4.0	U	4.0	4.9	U	4.9	12	U	12	12	U	12
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	10.6	X	0.11	45.8		0.085	43.5	X	0.36	44		3.3	27		6.6	37		4.3	14	J	4.1	35	J	5.0	27	J	12	14	J	12

19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Nickel	Vanadium	Zinc	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Indeno(1,2,3-cd)pyrene	Phenanthrene
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
22	SPA-4 re-sample 1[a]	J1FKM0/ J1FKM9	3/17/11	9.3	36.9	28.3	200	145	165	78	150	115	185
23	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	9.4	36.8	26.4	1.7	3.3	2.2	2.1	2.5	6.0	6.0
24	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	10.5	38.4	27.9	1.7	6.8	2.2	2.1	2.5	6.0	6.0
25	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	7.0	36.4	25.7	25	17	20	11	27	12	13
26	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	10.8	41.1	40.6	19	22	25	9.8	21	16	6.0
27	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	9.5	36.1	36.4	21	27	20	10	24	21	19
28	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	11.2	46.4	44.8	22	37	20	8.9	26	17	17
29	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	9.7	59.2	44.6	31	25	21	9.7	29	20	32
30	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	12.8	45.4	48.6	8.9	9.6	2.3	2.2	8.7	6.5	6.5
31	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	10.2	49.8	32.8	1.6	3.2	2.1	1.9	2.4	6.0	6.0
32	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	8.0	53.3	32.9	1.6	3.3	2.2	2.0	2.5	6.0	6.0
33	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	10.6	45.8	43.5	44	27	37	14	35	27	14

34 **Statistical Computations**

35		Nickel	Vanadium	Zinc	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Indeno(1,2,3-cd)pyrene	Phenanthrene
36	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), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.
37	N	12	12	12	12	12	12	12	12	12	12
38	% < Detection limit	0%	0%	0%	33%	25%	42%	42%	33%	42%	50%
39	Mean	9.9	43.8	36.0	31	27	27	13	28	22	26
40	Standard deviation	1.5	7.5	8.2	55	39	45	21	40	30	51
41	95% UCL on mean	10.8	48.0	41.1	58	88.5	48	23	47	36	50
42	Maximum value	12.8	59.2	48.6	230	170	190	87	160	120	240
43	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise**	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	15 ug/kg GW & River Protection	100 ug/kg GW & River Protection	330 ug/kg GW & River Protection	240000 ug/kg GW Protection
44	**WAC 173-340 3-PART TEST**										
45	95% UCL > Cleanup Limit?	NA	NA	NA	YES	YES	YES	YES	NO	NO	NO
46	> 10% above Cleanup Limit?	NA	NA	NA	YES	YES	YES	YES	NO	NO	NO
47	Any sample > 2X Cleanup Limit?	NA	NA	NA	YES	YES	YES	YES	NO	NO	NO
48	**WAC 173-340 Compliance?**	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.	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.	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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 26 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Pyrene			Bis(2-ethylhexyl)phthalate			Fluoride			Nitrogen in nitrate [b]			Nitrogen in Nitrite and Nitrate			Sulfate			TPH - diesel range			TPH - diesel range EXT		
4	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
5	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	400		12	110	JB	46	0.81	U	0.81	0.43	B	0.31	0.36	U	0.36	1.7	B	1.7	6900		690	15000		1000
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	300		12	110	JB	46	0.84	U	0.84	0.41	B	0.32	0.37	U	0.37	1.9	B	1.8	2200	J	690	5700		1000
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	12	U	12	110	JB	46	0.83	U	0.83	0.35	B	0.32	0.35	U	0.35	2.1	B	1.7	690	U	690	1000	U	1000
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	12	U	12	110	JB	44	0.82	U	0.82	0.36	B	0.31	0.37	U	0.37	1.7	U	1.7	640	U	640	940	U	940
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	54		12	100	JB	45	0.85	U	0.85	0.36	B	0.32	0.37	U	0.37	2.0	B	1.8	690	U	690	1000	U	1000
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	30	J	12	130	JB	47	0.86	U	0.86	40.1		0.33	39.9		0.37	43.6		1.8	11000		710	41000		1000
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	51		12	130	JB	49	0.95	B	0.89	44.8		0.34	50.9		0.36	18.2		1.9	8500		720	30000		1100
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	54		12	120	JB	49	1.1	B	0.83	0.61	B	0.32	0.43	B	0.38	2.0	B	1.8	9500		720	35000		1100
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	70		12	120	JB	47	1.8	B	0.87	0.94	B	0.33	0.85		0.38	55.6		1.8	7100		690	12000		1000
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	21	J	13	120	JB	50	0.96	B	0.91	0.55	B	0.35	0.46	B	0.40	2.8	B	1.9	4400		740	7700		1100
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	12	U	12	110	JB	46	0.88	B	0.82	0.41	B	0.31	0.36	U	0.36	5.4		1.7	820	J	690	2100	J	1000
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	12	U	12	110	JB	45	1.1	B	0.84	1.1	B	0.32	1.1		0.36	9.1		1.8	690	U	690	1000	U	1000
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	65		12	130	JB	47	0.97	B	0.85	0.76	B	0.32	0.62	B	0.38	3.3	B	1.8	4000	J	700	8800		1000

19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Pyrene	Bis(2-ethylhexyl)phthalate	Fluoride	Nitrogen in nitrate [b]	Nitrogen in Nitrite and Nitrate	Sulfate	TPH - diesel range	TPH - diesel range EXT
21	Area	Number	Date	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg
22	SPA-4 re-sample 1[a]	J1FKM0/ J1FKM9	3/17/11	350	110	0.41	0.42	0.18	1.8	4550	10350
23	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	6.0	110	0.42	0.35	0.18	2.1	345	500
24	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	6.0	110	0.41	0.36	0.19	0.9	320	470
25	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	54	100	0.43	0.36	0.19	2.0	345	500
26	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	30	130	0.43	40.1	39.9	43.6	11000	41000
27	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	51	130	0.95	44.8	50.9	18.2	8500	30000
28	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	54	120	1.1	0.61	0.43	2.0	9500	35000
29	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	70	120	1.8	0.94	0.85	55.6	7100	12000
30	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	21	120	0.96	0.55	0.46	2.8	4400	7700
31	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	6.0	110	0.88	0.41	0.18	5.4	820	2100
32	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	6.0	110	1.1	1.1	1.1	9.1	345	500
33	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	65	130	0.97	0.76	0.62	3.3	4000	8800

34 **Statistical Computations**

35		Pyrene	Bis(2-ethylhexyl)phthalate	Fluoride	Nitrogen in nitrate [b]	Nitrogen in Nitrite and Nitrate	Sulfate	TPH - diesel range	TPH - diesel range EXT
36	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), 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.
37	N	12	12	12	12	12	12	12	12
38	% < Detection limit	33%	0%	42%	0%	42%	8%	33%	33%
39	Mean	60	117	0.82	7.6	7.9	12.2	4269	12410
40	Standard deviation	95	10	0.42	16.3	17.7	18.3	3959	14620
41	95% UCL on mean	105	121	1.0	15.3	16.0	51.6	6149	19353
42	Maximum value	400	130	1.8	44.8	50.9	55.6	11000	41000
43	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise**	48000 ug/kg GW Protection	360 ug/kg River Protection	96.0 GW Protection	1000 GW Protection	1000 GW Protection	25000 GW Protection	200000 ug/kg DE, GW & River Protection	200000 ug/kg DE, GW & River Protection
44	**WAC 173-340 3-PART TEST**								
45	95% UCL > Cleanup Limit?	NO	NO	NA	NO	NO	NA	NO	NO
46	> 10% above Cleanup Limit?	NO	NO	NA	NO	NO	NA	NO	NO
47	Any sample > 2X Cleanup Limit?	NO	NO	NA	NO	NO	NA	NO	NO
48	**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 (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.	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.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 27 of 47

1 **116-H-5 Statistical Calculations**

2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	TPH - motor oil (high boiling)		
4	Area	Number	Date	ug/kg	Q	PQL
5	SPA-8	J19YJ4	5/17/10	40800		10100
6	Duplicate of J19YJ4	J19YJ9	5/17/10	64900		10100
7	SPA-1	J19YH7	5/17/10	184000		9910
8	SPA-2	J19YH8	5/17/10	17400		9800
9	SPA-3	J19YH9	5/17/10	10400		10100
10	SPA-4	J19YJ0	5/17/10	8660	J	9920
11	SPA-5	J19YJ1	5/17/10	14900		9990
12	SPA-6	J19YJ2	5/17/10	141000		10100
13	SPA-7	J19YJ3	5/17/10	10500		9970
14	SPA-9	J19YJ5	5/17/10	60800		10100
15	SPA-10	J19YJ6	5/17/10	58900		10000
16	SPA-11	J19YJ7	5/17/10	39100		9930
17	SPA-12	J19YJ8	5/17/10	53900		10000

19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	TPH - motor oil (high boiling)		
21	Area	Number	Date	ug/kg		
22	SPA-8	J19YJ4/ J19YJ9	5/17/10	52850		
23	SPA-1	J19YH7	5/17/10	184000		
24	SPA-2	J19YH8	5/17/10	17400		
25	SPA-3	J19YH9	5/17/10	10400		
26	SPA-4	J19YJ0	5/17/10	8660		
27	SPA-5	J19YJ1	5/17/10	14900		
28	SPA-6	J19YJ2	5/17/10	141000		
29	SPA-7	J19YJ3	5/17/10	10500		
30	SPA-9	J19YJ5	5/17/10	60800		
31	SPA-10	J19YJ6	5/17/10	58900		
32	SPA-11	J19YJ7	5/17/10	39100		
33	SPA-12	J19YJ8	5/17/10	53900		

34 **Statistical Computations**

35		TPH - motor oil (high boiling)		
36	95% UCL based on	Large data set (n ≥10), use MTCAStat lognormal distribution.		
37	N	12		
38	% < Detection limit	0%		
39	Mean	54368		
40	Standard deviation	55168		
41	95% UCL on mean	147061		
42	Maximum value	184000		
43	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless noted otherwise**	200000 ug/kg	DE, GW & River Protection	
44	**WAC 173-340 3-PART TEST**			
45	95% UCL > Cleanup Limit?	NO		
46	> 10% above Cleanup Limit?	NO		
47	Any sample > 2X Cleanup Limit?	NO		
48	**WAC 173-340 Compliance?**	The data set meets the 3-part test criteria when compared to the most stringent RAG.		

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

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1 **116-H-5 Maximum Calculations**
2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Mercury			Molybdenum			Acenaphthylene			Anthracene			Benzo(ghi)perylene			Dibenz[a,h]anthracene			Fluoranthene			Fluorene			Aroclor-1254		
4	Area	Number	Date	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	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.0054	U	0.0054	0.23	U	0.23	8.7	U	8.7	87		3.0	96		7.0	26	JX	11	400		13	57		5.1	2.7	U	2.7
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.0052	U	0.0052	0.27	U	0.27	8.6	U	8.6	48		2.9	38	X	6.9	19	JX	11	290		12	31		5.1	2.6	U	2.6
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.0056	U	0.0056	0.23	U	0.23	9.3	U	9.3	3.1	U	3.1	7.4	U	7.4	11	U	11	13	U	13	5.4	U	5.4	2.6	U	2.6
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0.0056	U	0.0056	0.25	U	0.25	27	J	9.3	3.1	U	3.1	7.4	U	7.4	11	U	11	13	U	13	5.4	U	5.4	2.5	U	2.5
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.0058	U	0.0058	0.23	U	0.23	8.8	U	8.8	3.5	J	3.0	7.0	U	7.0	11	U	11	45		13	5.1	U	5.1	2.6	U	2.6
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.013	B	0.0056	0.33	B	0.23	8.7	U	8.7	3.0	U	3.0	7.0	U	7.0	11	U	11	17	JX	13	5.1	U	5.1	15		2.6
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.0080	B	0.0057	0.23	U	0.23	9.3	U	9.3	3.2	U	3.2	7.4	U	7.4	11	U	11	13	U	13	5.5	U	5.5	2.8	U	2.8
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.0083	B	0.0060	0.27	U	0.27	9.1	U	9.1	3.1	U	3.1	7.3	U	7.3	11	U	11	13	U	13	5.3	U	5.3	2.8	U	2.8
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.014	B	0.0056	0.28	U	0.28	9.2	U	9.2	3.1	U	3.1	7.4	U	7.4	11	U	11	13	U	13	5.4	U	5.4	2.8	U	2.8
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0.0053	U	0.0053	0.26	U	0.26	9.7	U	9.7	3.3	U	3.3	7.8	U	7.8	12	U	12	14	U	14	5.7	U	5.7	2.8	U	2.8
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0.0054	U	0.0054	0.26	U	0.26	8.8	U	8.8	3.0	U	3.0	7.0	U	7.0	11	U	11	13	U	13	5.2	U	5.2	2.5	U	2.5
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.0057	U	0.0057	0.22	U	0.22	9.1	U	9.1	3.1	U	3.1	7.3	U	7.3	11	U	11	13	U	13	5.4	U	5.4	2.6	U	2.6
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.011	BN	0.0054	0.23	U	0.23	9.3	U	9.3	3.2	U	3.2	7.5	U	7.5	11	U	11	13	U	13	5.5	U	5.5	2.6	U	2.6

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19 **Statistical Computations**

20		Mercury	Molybdenum	Acenaphthylene	Anthracene	Benzo(ghi)perylene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Aroclor-1254
21	% < Detection limit	58%	92%	92%	83%	92%	92%	75%	92%	92%
22	Maximum value	0.014	0.33	27	87	96	26	400	57	15
23	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted**	0.33 GW & River Protection	8 GW Protection	96000 ug/kg GW Protection	240000 ug/kg GW Protection	48000 ug/kg GW & River Protection	30 ug/kg GW & River Protection	18000 ug/kg River Protection	64000 ug/kg GW Protection	17 ug/kg GW & River Protection
24	**3-PART TEST**									
25	Maximum > Cleanup Limit?	NA	NO	NO	NO	NO	NO	NO	NO	NO
26	> 10% above Cleanup Limit?	NA	NO	NO	NO	NO	NO	NO	NO	NO
27	Any sample > 2X Cleanup Limit?	NA	NO	NO	NO	NO	NO	NO	NO	NO
28	**3-Part Test Compliance?**	Because all values are below background (0.33 mg/kg) the 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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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1 **116-H-5 Maximum Calculations**
2 **Verification Data -Staging Pile Area**

3	Sample	Sample	Sample	Aroclor-1260			4,4'-DDE			4,4'-DDT			Chloride		
4	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL
5	SPA-4 re-sample 1[a]	J1FKM0	3/17/11	2.7	U	2.7	0.24	U	0.24	0.59	U	0.59	1.9	U	1.9
6	Duplicate of J1FKM0[a]	J1FKM9	3/17/11	2.6	U	2.6	0.25	U	0.25	0.61	U	0.61	2.0	U	2.0
7	SPA-1 re-sample 1[a]	J1FKL7	3/17/11	2.6	U	2.6	0.24	U	0.24	0.59	U	0.59	2.0	U	2.0
8	SPA-2 re-sample 1[a]	J1FKL8	3/17/11	2.5	U	2.5	0.24	U	0.24	0.60	U	0.60	2.0	U	2.0
9	SPA-3 re-sample 1[a]	J1FKL9	3/17/11	2.6	U	2.6	0.25	U	0.25	0.61	U	0.61	2.0	U	2.0
10	SPA-5 re-sample 1[a]	J1FKM1	3/17/11	10		2.6	14		0.25	5.3		0.61	9.5		2.0
11	SPA-6 re-sample 1[a]	J1FKM2	3/17/11	2.8	U	2.8	40	DN	0.51	4.4		0.63	6.4		2.1
12	SPA-7 re-sample 1[a]	J1FKM3	3/17/11	2.8	U	2.8	1.1	J	0.25	0.74	J	0.63	2.0	U	2.0
13	SPA-8 re-sample 1[a]	J1FKM4	3/17/11	2.8	U	2.8	0.46	JX	0.25	0.62	U	0.62	2.1	U	2.1
14	SPA-9 re-sample 1[a]	J1FKM5	3/17/11	2.8	U	2.8	0.26	U	0.26	0.65	U	0.65	2.2	U	2.2
15	SPA-10 re-sample 1[a]	J1FKM6	3/17/11	2.5	U	2.5	0.24	U	0.24	0.59	U	0.59	2.0	U	2.0
16	SPA-11 re-sample 1[a]	J1FKM7	3/17/11	2.6	U	2.6	0.24	U	0.24	0.58	U	0.58	5.0	B	2.0
17	SPA-12 re-sample 1[a]	J1FKM8	3/17/11	2.6	U	2.6	0.33	JX	0.25	0.61	U	0.61	2.0	U	2.0

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19 **Statistical Computations**

20		Aroclor-1260			4,4'-DDE			4,4'-DDT			Chloride		
21	% < Detection limit	92%			58%			75%			75%		
22	Maximum value	10			40			5.3			9.5		
23	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted**	17 ug/kg	GW & River Protection		3.3 ug/kg	River Protection		3.3 ug/kg	River Protection		25000	GW Protection	
24	**3-PART TEST**												
25	Maximum > Cleanup Limit?	NO			YES			YES			NA		
26	> 10% above Cleanup Limit?	NO			YES			YES			NA		
27	Any sample > 2X Cleanup Limit?	NO			YES			NO			NA		
28	**3-Part Test 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 direct exposure RAG.			The data set meets the 3-part test criteria when compared to the direct exposure RAG.			Because all values are below background (100 mg/kg) the 3-part test is not required.		

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CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	**Date**	05/17/11	**Calc. No.**	0100H-CA-V0164
Project	100-H Field Remediation	**Job No.**	14655	**Checked**	T. E. Queen
Subject	116-H-5 Waste Site Cleanup Verification 95% UCL Calculations				

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Ecology Software (MTCAStat) Results, 116-H-5 Shallow Zone

Arsenic 95% UCL Calculation

DATA	ID
4.13	J19YB9/ J19YD0
2.13	J19YB8
2.83	J19YC0
5.32	J19YC1
6.45	J19YC2
3.75	J19YC3
6.58	J19YC4
4.84	J19YC5
4.80	J1FKL4
7.65	J19YC7
1.10	J1FKL5
3.06	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	4.39
Censored		Lognormal mean	4.54
Detection limit or PQL		Std. devn.	1.94
Method detection limit		Median	4.47
TOTAL	12	Min.	1.10
		Max.	7.65

Lognormal distribution? r-squared is: 0.919
Normal distribution? r-squared is: 0.991
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.53

Barium 95% UCL Calculation

DATA	ID
64.0	J19YB9/ J19YD0
33.6	J19YB8
69.8	J19YC0
51.9	J19YC1
46.7	J19YC2
63.4	J19YC3
52.0	J19YC4
62.2	J19YC5
69.6	J1FKL4
54.8	J19YC7
43.0	J1FKL5
50.7	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	55.1
Censored		Lognormal mean	55.3
Detection limit or PQL		Std. devn.	11.0
Method detection limit		Median	53.4
TOTAL	12	Min.	33.6
		Max.	69.8

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.960
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 62.4

Beryllium 95% UCL Calculation

DATA	ID
0.248	J19YB9/ J19YD0
0.130	J19YB8
0.208	J19YC0
0.172	J19YC1
0.192	J19YC2
0.216	J19YC3
0.193	J19YC4
0.206	J19YC5
0.110	J1FKL4
0.181	J19YC7
0.015	J1FKL5
0.155	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.169
Censored		Lognormal mean	0.193
Detection limit or PQL		Std. devn.	0.061
Method detection limit		Median	0.187
TOTAL	12	Min.	0.015
		Max.	0.248

Lognormal distribution? r-squared is: 0.568
Normal distribution? r-squared is: 0.865
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 0.198

Boron 95% UCL Calculation

DATA	ID
1.17	J19YB9/ J19YD0
0.76	J19YB8
3.44	J19YC0
1.26	J19YC1
1.12	J19YC2
1.26	J19YC3
1.18	J19YC4
1.34	J19YC5
1.00	J1FKL4
0.97	J19YC7
0.43	J1FKL5
1.00	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	1.24
Censored		Lognormal mean	1.24
Detection limit or PQL		Std. devn.	0.74
Method detection limit		Median	1.14
TOTAL	12	Min.	0.43
		Max.	3.44

Lognormal distribution? r-squared is: 0.813
Normal distribution? r-squared is: 0.613
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 1.59

Cadmium 95% UCL Calculation

DATA	ID
0.093	J19YB9/ J19YD0
0.041	J19YB8
0.086	J19YC0
0.065	J19YC1
0.060	J19YC2
0.059	J19YC3
0.052	J19YC4
0.101	J19YC5
0.074	J1FKL4
0.059	J19YC7
0.070	J1FKL5
0.105	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.072
Censored		Lognormal mean	0.072
Detection limit or PQL		Std. devn.	0.020
Method detection limit		Median	0.068
TOTAL	12	Min.	0.041
		Max.	0.105

Lognormal distribution? r-squared is: 0.969
Normal distribution? r-squared is: 0.957
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.0853

Chromium 95% UCL Calculation

DATA	ID
18.6	J19YB9/ J19YD0
8.93	J19YB8
12.7	J19YC0
10.4	J19YC1
11.0	J19YC2
12.8	J19YC3
11.7	J19YC4
12.6	J19YC5
9.90	J1FKL4
10.2	J19YC7
5.30	J1FKL5
13.1	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	11.4
Censored		Lognormal mean	11.5
Detection limit or PQL		Std. devn.	3.12
Method detection limit		Median	11.4
TOTAL	12	Min.	5.30
		Max.	18.6

Lognormal distribution? r-squared is: 0.859
Normal distribution? r-squared is: 0.890
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 12.9

Cobalt 95% UCL Calculation

DATA	ID
5.88	J19YB9/ J19YD0
4.91	J19YB8
5.79	J19YC0
6.11	J19YC1
5.45	J19YC2
6.41	J19YC3
5.82	J19YC4
5.65	J19YC5
6.60	J1FKL4
5.60	J19YC7
7.60	J1FKL5
5.38	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	5.93
Censored		Lognormal mean	5.94
Detection limit or PQL		Std. devn.	0.69
Method detection limit		Median	5.81
TOTAL	12	Min.	4.91
		Max.	7.60

Lognormal distribution? r-squared is: 0.934
Normal distribution? r-squared is: 0.901
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.30

Copper 95% UCL Calculation

DATA	ID
12.0	J19YB9/ J19YD0
12.2	J19YB8
13.1	J19YC0
16.1	J19YC1
13.0	J19YC2
12.8	J19YC3
13.3	J19YC4
12.0	J19YC5
17.3	J1FKL4
14.3	J19YC7
14.5	J1FKL5
12.5	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	13.6
Censored		Lognormal mean	13.6
Detection limit or PQL		Std. devn.	1.68
Method detection limit		Median	13.1
TOTAL	12	Min.	12.0
		Max.	17.3

Lognormal distribution? r-squared is: 0.892
Normal distribution? r-squared is: 0.864
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 14.4

Lead 95% UCL Calculation

DATA	ID
5.04	J19YB9/ J19YD0
3.44	J19YB8
8.37	J19YC0
15.2	J19YC1
15.9	J19YC2
6.41	J19YC3
17.3	J19YC4
15.1	J19YC5
8.00	J1FKL4
24.2	J19YC7
2.30	J1FKL5
5.80	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	10.6
Censored		Lognormal mean	11.1
Detection limit or PQL		Std. devn.	6.76
Method detection limit		Median	8.19
TOTAL	12	Min.	2.30
		Max.	24.2

Lognormal distribution? r-squared is: 0.961
Normal distribution? r-squared is: 0.922
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 18.8

CALCULATION SHEET

Washington Closure Hanford

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Project 100-H Field Remediation
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Ecology Software (MTCAStat) Results, 116-H-5 Shallow Zone

Manganese 95% UCL Calculation

DATA	ID
267	J19YB9/ J19YD0
227	J19YB8
268	J19YC0
257	J19YC1
263	J19YC2
274	J19YC3
272	J19YC4
270	J19YC5
284	J1FKL4
266	J19YC7
234	J1FKL5
251	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	261
Censored		Lognormal mean	261
Detection limit or PQL		Std. devn.	16.6
Method detection limit		Median	267
TOTAL	12	Min.	227
		Max.	284

Lognormal distribution? r-squared is: 0.876
Normal distribution? r-squared is: 0.893
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 269

Molybdenum 95% UCL Calculation

DATA	ID
0.269	J19YB9/ J19YD0
0.252	J19YB8
0.271	J19YC0
0.276	J19YC1
0.233	J19YC2
0.321	J19YC3
0.260	J19YC4
0.252	J19YC5
0.125	J1FKL4
0.250	J19YC7
0.115	J1FKL5
0.298	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.243
Censored		Lognormal mean	0.246
Detection limit or PQL		Std. devn.	0.062
Method detection limit		Median	0.256
TOTAL	12	Min.	0.115
		Max.	0.321

Lognormal distribution? r-squared is: 0.713
Normal distribution? r-squared is: 0.803
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 0.273

Nickel 95% UCL Calculation

DATA	ID
13.9	J19YB9/ J19YD0
8.94	J19YB8
10.9	J19YC0
9.84	J19YC1
10.0	J19YC2
10.8	J19YC3
10.0	J19YC4
10.2	J19YC5
11.1	J1FKL4
9.63	J19YC7
11.5	J1FKL5
12.5	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	10.8
Censored		Lognormal mean	10.8
Detection limit or PQL		Std. devn.	1.36
Method detection limit		Median	10.5
TOTAL	12	Min.	8.94
		Max.	13.9

Lognormal distribution? r-squared is: 0.940
Normal distribution? r-squared is: 0.909
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.5

Vanadium 95% UCL Calculation

DATA	ID
48.2	J19YB9/ J19YD0
42.9	J19YB8
47.0	J19YC0
46.8	J19YC1
46.1	J19YC2
52.8	J19YC3
49.4	J19YC4
45.2	J19YC5
42.6	J1FKL4
45.4	J19YC7
47.4	J1FKL5
46.6	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	46.7
Censored		Lognormal mean	46.7
Detection limit or PQL		Std. devn.	2.74
Method detection limit		Median	46.7
TOTAL	12	Min.	42.6
		Max.	52.8

Lognormal distribution? r-squared is: 0.944
Normal distribution? r-squared is: 0.934
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 48.2

Zinc 95% UCL Calculation

DATA	ID
35.9	J19YB9/ J19YD0
29.0	J19YB8
68.7	J19YC0
38.0	J19YC1
33.4	J19YC2
39.2	J19YC3
35.8	J19YC4
69.8	J19YC5
35.2	J1FKL4
34.8	J19YC7
34.3	J1FKL5
35.5	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	40.8
Censored		Lognormal mean	40.7
Detection limit or PQL		Std. devn.	13.5
Method detection limit		Median	35.7
TOTAL	12	Min.	29.0
		Max.	69.8

Lognormal distribution? r-squared is: 0.698
Normal distribution? r-squared is: 0.630
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 47.2

Benzo(a)anthracene 95% UCL Calculation

DATA	ID
1.40	J19YB9/ J19YD0
1.05	J19YB8
4.71	J19YC0
7.32	J19YC1
8.99	J19YC2
3.11	J19YC3
11.2	J19YC4
6.59	J19YC5
10.0	J1FKL4
15.5	J19YC7
23.0	J1FKL5
1.70	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	7.88
Censored		Lognormal mean	8.80
Detection limit or PQL		Std. devn.	6.50
Method detection limit		Median	6.96
TOTAL	12	Min.	1.05
		Max.	23.0

Lognormal distribution? r-squared is: 0.959
Normal distribution? r-squared is: 0.898
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 20.8

Benzo(a)pyrene 95% UCL Calculation

DATA	ID
1.57	J19YB9/ J19YD0
1.76	J19YB8
5.05	J19YC0
6.97	J19YC1
8.99	J19YC2
3.98	J19YC3
11.4	J19YC4
8.15	J19YC5
11.0	J1FKL4
15.8	J19YC7
18.0	J1FKL5
1.19	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	7.82
Censored		Lognormal mean	8.71
Detection limit or PQL		Std. devn.	5.52
Method detection limit		Median	7.56
TOTAL	12	Min.	1.19
		Max.	18.0

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.952
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 18.8

Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
1.35	J19YB9/ J19YD0
0.88	J19YB8
6.73	J19YC0
11.3	J19YC1
9.17	J19YC2
7.95	J19YC3
18.4	J19YC4
12.0	J19YC5
5.70	J1FKL4
24.9	J19YC7
20.0	J1FKL5
1.19	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	10.0
Censored		Lognormal mean	12.3
Detection limit or PQL		Std. devn.	7.79
Method detection limit		Median	8.56
TOTAL	12	Min.	0.88
		Max.	24.9

Lognormal distribution? r-squared is: 0.893
Normal distribution? r-squared is: 0.938
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 14.0

Benzo(ghi)perylene 95% UCL Calculation

DATA	ID
1.48	J19YB9/ J19YD0
1.76	J19YB8
3.87	J19YC0
1.74	J19YC1
6.52	J19YC2
3.63	J19YC3
10.1	J19YC4
9.36	J19YC5
3.80	J1FKL4
23.4	J19YC7
3.60	J1FKL5
1.70	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	5.91
Censored		Lognormal mean	5.88
Detection limit or PQL		Std. devn.	6.23
Method detection limit		Median	3.72
TOTAL	12	Min.	1.48
		Max.	23.4

Lognormal distribution? r-squared is: 0.922
Normal distribution? r-squared is: 0.689
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.7

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
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Ecology Software (MTCAStat) Results, 116-H-5 Shallow Zone

Benzo(k)fluoranthene 95% UCL Calculation

DATA	ID
1.83	J19YB9/ J19YD0
1.76	J19YB8
2.52	J19YC0
3.49	J19YC1
3.88	J19YC2
1.73	J19YC3
5.77	J19YC4
3.99	J19YC5
5.80	J1FKL4
8.59	J19YC7
10.0	J1FKL5
1.70	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	4.25
Censored		Lognormal mean	4.32
Detection limit or PQL		Std. devn.	2.79
Method detection limit		Median	3.69
TOTAL	12	Min.	1.70
		Max.	10.0

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.867
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.75

Chrysene 95% UCL Calculation

DATA	ID
1.83	J19YB9/ J19YD0
1.05	J19YB8
5.38	J19YC0
8.37	J19YC1
11.5	J19YC2
2.94	J19YC3
16.4	J19YC4
4.68	J19YC5
10.0	J1FKL4
12.2	J19YC7
18.0	J1FKL5
0.85	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	7.77
Censored		Lognormal mean	9.08
Detection limit or PQL		Std. devn.	5.92
Method detection limit		Median	6.88
TOTAL	12	Min.	0.85
		Max.	18.0

Lognormal distribution? r-squared is: 0.932
Normal distribution? r-squared is: 0.944
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 23.6

Fluoranthene 95% UCL Calculation

DATA	ID
2.25	J19YB9/ J19YD0
2.46	J19YB8
21.4	J19YC0
19.9	J19YC1
31.2	J19YC2
9.34	J19YC3
27.1	J19YC4
25.0	J19YC5
7.00	J1FKL4
38.5	J19YC7
48.0	J1FKL5
3.06	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	19.6
Censored		Lognormal mean	23.5
Detection limit or PQL		Std. devn.	15.1
Method detection limit		Median	20.7
TOTAL	12	Min.	2.25
		Max.	48.0

Lognormal distribution? r-squared is: 0.900
Normal distribution? r-squared is: 0.942
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 66.6

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

DATA	ID
1.83	J19YB9/ J19YD0
1.76	J19YB8
4.54	J19YC0
7.15	J19YC1
6.70	J19YC2
5.01	J19YC3
9.97	J19YC4
8.32	J19YC5
6.50	J1FKL4
16.8	J19YC7
14.0	J1FKL5
1.70	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	7.02
Censored		Lognormal mean	7.46
Detection limit or PQL		Std. devn.	4.75
Method detection limit		Median	6.60
TOTAL	12	Min.	1.70
		Max.	16.8

Lognormal distribution? r-squared is: 0.926
Normal distribution? r-squared is: 0.920
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13.6

Phenanthrene 95% UCL Calculation

DATA	ID
1.18	J19YB9/ J19YD0
1.58	J19YB8
7.57	J19YC0
5.93	J19YC1
11.6	J19YC2
3.98	J19YC3
10.5	J19YC4
9.88	J19YC5
6.50	J1FKL4
10.8	J19YC7
31.0	J1FKL5
1.53	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	8.50
Censored		Lognormal mean	9.30
Detection limit or PQL		Std. devn.	8.03
Method detection limit		Median	7.04
TOTAL	12	Min.	1.18
		Max.	31.0

Lognormal distribution? r-squared is: 0.926
Normal distribution? r-squared is: 0.743
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 21.7

Pyrene 95% UCL Calculation

DATA	ID
1.83	J19YB9/ J19YD0
1.23	J19YB8
14.5	J19YC0
17.3	J19YC1
23.1	J19YC2
6.40	J19YC3
29.4	J19YC4
16.5	J19YC5
48.0	J1FKL4
3.06	J19YC7
47.0	J1FKL5
1.70	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	17.7
Censored		Lognormal mean	23.3
Detection limit or PQL		Std. devn.	14.8
Method detection limit		Median	15.5
TOTAL	12	Min.	1.23
		Max.	47.0

Lognormal distribution? r-squared is: 0.892
Normal distribution? r-squared is: 0.924
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 25.4

Fluoride 95% UCL Calculation

DATA	ID
0.8	J19YB9/ J19YD0
0.5	J19YB8
0.7	J19YC0
0.8	J19YC1
0.4	J19YC2
0.4	J19YC3
0.9	J19YC4
0.9	J19YC5
1.5	J1FKL4
0.5	J19YC7
0.4	J1FKL5
1.2	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.7
Censored		Lognormal mean	0.7
Detection limit or PQL		Std. devn.	0.3
Method detection limit		Median	0.7
TOTAL	12	Min.	0.4
		Max.	1.5

Lognormal distribution? r-squared is: 0.943
Normal distribution? r-squared is: 0.896
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.98

Nitrogen in nitrate 95% UCL Calculation

DATA	ID
0.7	J19YB9/ J19YD0
0.8	J19YB8
0.2	J19YC0
1.1	J19YC1
1.8	J19YC2
1.9	J19YC3
0.7	J19YC4
3.4	J19YC5
1.1	J1FKL4
2.1	J19YC7
0.4	J1FKL5
0.8	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	1.2
Censored		Lognormal mean	1.3
Detection limit or PQL		Std. devn.	0.9
Method detection limit		Median	0.9
TOTAL	12	Min.	0.2
		Max.	3.4

Lognormal distribution? r-squared is: 0.949
Normal distribution? r-squared is: 0.878
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 2.44

Nitrogen in nitrate and nitrite 95% UCL Calculation

DATA	ID
0.6	J19YB9/ J19YD0
1.4	J19YB8
0.2	J19YC0
0.7	J19YC1
1.2	J19YC2
1.0	J19YC3
0.7	J19YC4
2.4	J19YC5
0.5	J1FKL4
1.7	J19YC7
0.2	J1FKL5
0.5	J19YC9

Number of samples		Uncensored values	
Uncensored	12	Mean	0.9
Censored		Lognormal mean	1.0
Detection limit or PQL		Std. devn.	0.7
Method detection limit		Median	0.7
TOTAL	12	Min.	0.2
		Max.	2.4

Lognormal distribution? r-squared is: 0.947
Normal distribution? r-squared is: 0.904
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 1.9

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
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Checked T. E. Queen

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Ecology Software (MTCAStat) Results, 116-H-5 Shallow Zone

Sulfate 95% UCL Calculation

	DATA	ID				
1	2.9	J19YB9/ J19YD0				
2						
3	3.2	J19YB8				
4	1.9	J19YC0	Number of samples		Uncensored values	
5	4.6	J19YC1	Uncensored	12	Mean	5.7
6	5.4	J19YC2	Censored		Lognormal mean	5.8
7	10	J19YC3	etection limit or PQL		Std. devn.	3.8
8	6.2	J19YC4	lethod detection limit		Median	5.0
9	14	J19YC5	TOTAL	12	Min.	1.9
10	5.8	J1FKL4			Max.	14
11	9.3	J19YC7				
12	2.1	J1FKL5				
13	2.6	J19YC9				
14						
15			Lognormal distribution?		Normal distribution?	
16			r-squared is: 0.973		r-squared is: 0.880	
17			Recommendations:			
18			Use lognormal distribution.			
19						
20			UCL (Land's method) is		9.2	

TPH-motor oil (high boiling) 95% UCL Calculation

DATA	ID				
5425	J19YB9/ J19YD0				
5250	J19YB8				
27600	J19YC0	Number of samples		Uncensored values	
4760	J19YC1	Uncensored	12	Mean	8944
5300	J19YC2	Censored		Lognormal mean	8443
4330	J19YC3	etection limit or PQL		Std. devn.	9284
4900	J19YC4	lethod detection limit		Median	5175
3850	J19YC5	TOTAL	12	Min.	3850
29900	J19YC6			Max.	29900
4620	J19YC7				
6290	J19YC8				
5100	J19YC9				
		Lognormal distribution?		Normal distribution?	
		r-squared is: 0.630		r-squared is 0.528	
		Recommendations:			
		Reject BOTH lognormal and normal distributions			
		UCL (based on Z-statistic) is		13352	

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Ecology Software (MTCAStat) Results, 116-H-5 Deep Zone

Arsenic 95% UCL Calculation

DATA	ID
6.4	J1HH85/ J1HH86
7.0	J1HH80
2.5	J1HH81
1.9	J1HH82
4.8	J1HH83
9.8	J1FKK5
1.8	J1FKK6
4.2	J1HH84
1.1	J1FKK9
2.4	J1FKL0
2.8	J1FKL1
3.2	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	4.0
Censored		Lognormal mean	4.1
Detection limit or PQL		Std. devn.	2.6
Method detection limit		Median	3.0
TOTAL	12	Min.	1.1
		Max.	9.8

Lognormal distribution? r-squared is: 0.986
Normal distribution? r-squared is: 0.890
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.3

Barium 95% UCL Calculation

DATA	ID
42.8	J1HH85/ J1HH86
60.9	J1HH80
57.7	J1HH81
59.7	J1HH82
68.3	J1HH83
35.5	J1FKK5
50.3	J1FKK6
34.7	J1HH84
77.1	J1FKK9
57.4	J1FKL0
69.0	J1FKL1
90.3	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	58.6
Censored		Lognormal mean	58.9
Detection limit or PQL		Std. devn.	16.5
Method detection limit		Median	58.7
TOTAL	12	Min.	34.7
		Max.	90.3

Lognormal distribution? r-squared is: 0.958
Normal distribution? r-squared is: 0.970
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 69.8

Beryllium 95% UCL Calculation

DATA	ID
0.125	J1HH85/ J1HH86
0.130	J1HH80
0.063	J1HH81
0.042	J1HH82
0.160	J1HH83
0.016	J1FKK5
0.015	J1FKK6
0.098	J1HH84
0.016	J1FKK9
0.017	J1FKL0
0.074	J1FKL1
0.017	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	0.064
Censored		Lognormal mean	0.070
Detection limit or PQL		Std. devn.	0.053
Method detection limit		Median	0.053
TOTAL	12	Min.	0.015
		Max.	0.160

Lognormal distribution? r-squared is: 0.870
Normal distribution? r-squared is: 0.878
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 0.089

Cadmium 95% UCL Calculation

DATA	ID
0.165	J1HH85/ J1HH86
0.067	J1HH80
0.046	J1HH81
0.042	J1HH82
0.081	J1HH83
0.020	J1FKK5
0.052	J1FKK6
0.055	J1HH84
0.020	J1FKK9
0.021	J1FKL0
0.021	J1FKL1
0.064	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	0.054
Censored		Lognormal mean	0.055
Detection limit or PQL		Std. devn.	0.041
Method detection limit		Median	0.049
TOTAL	12	Min.	0.020
		Max.	0.165

Lognormal distribution? r-squared is: 0.917
Normal distribution? r-squared is: 0.769
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.089

Chromium 95% UCL Calculation

DATA	ID
14.0	J1HH85/ J1HH86
9.80	J1HH80
6.20	J1HH81
15.1	J1HH82
12.9	J1HH83
7.60	J1FKK5
7.20	J1FKK6
8.80	J1HH84
6.50	J1FKK9
8.70	J1FKL0
11.6	J1FKL1
8.30	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	9.72
Censored		Lognormal mean	9.75
Detection limit or PQL		Std. devn.	2.98
Method detection limit		Median	8.75
TOTAL	12	Min.	6.20
		Max.	15.1

Lognormal distribution? r-squared is: 0.963
Normal distribution? r-squared is: 0.929
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.6

Cobalt 95% UCL Calculation

DATA	ID
5.4	J1HH85/ J1HH86
6.2	J1HH80
6.4	J1HH81
6.6	J1HH82
6.3	J1HH83
5.1	J1FKK5
5.5	J1FKK6
4.7	J1HH84
5.5	J1FKK9
5.7	J1FKL0
6.4	J1FKL1
6.7	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	5.9
Censored		Lognormal mean	5.9
Detection limit or PQL		Std. devn.	0.6
Method detection limit		Median	6.0
TOTAL	12	Min.	4.7
		Max.	6.7

Lognormal distribution? r-squared is: 0.936
Normal distribution? r-squared is: 0.944
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.2

Copper 95% UCL Calculation

DATA	ID
17.4	J1HH85/ J1HH86
14.0	J1HH80
15.3	J1HH81
13.4	J1HH82
14.4	J1HH83
12.8	J1FKK5
15.4	J1FKK6
11.7	J1HH84
12.7	J1FKK9
13.6	J1FKL0
15.9	J1FKL1
15.8	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	14.4
Censored		Lognormal mean	14.4
Detection limit or PQL		Std. devn.	1.63
Method detection limit		Median	14.2
TOTAL	12	Min.	11.7
		Max.	17.4

Lognormal distribution? r-squared is: 0.982
Normal distribution? r-squared is: 0.980
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 15.3

Lead 95% UCL Calculation

DATA	ID
15.8	J1HH85/ J1HH86
18.5	J1HH80
4.20	J1HH81
2.90	J1HH82
11.4	J1HH83
31.3	J1FKK5
8.40	J1FKK6
11.3	J1HH84
3.50	J1FKK9
6.00	J1FKL0
8.40	J1FKL1
9.80	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	11.0
Censored		Lognormal mean	11.2
Detection limit or PQL		Std. devn.	7.98
Method detection limit		Median	9.10
TOTAL	12	Min.	2.90
		Max.	31.3

Lognormal distribution? r-squared is: 0.980
Normal distribution? r-squared is: 0.842
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 18.7

Manganese 95% UCL Calculation

DATA	ID
225	J1HH85/ J1HH86
283	J1HH80
252	J1HH81
231	J1HH82
261	J1HH83
209	J1FKK5
217	J1FKK6
206	J1HH84
219	J1FKK9
230	J1FKL0
260	J1FKL1
284	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	240
Censored		Lognormal mean	240
Detection limit or PQL		Std. devn.	27.4
Method detection limit		Median	231
TOTAL	12	Min.	206
		Max.	284

Lognormal distribution? r-squared is: 0.940
Normal distribution? r-squared is: 0.929
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 255

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Originator J. D. Skoglie	**Date** 05/17/11	**Calc. No.** 0100H-CA-V0164	**Rev. No.** 0
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Nickel 95% UCL Calculation

DATA	ID
10.6	J1HH85/ J1HH86
10.6	J1HH80
8.10	J1HH81
12.8	J1HH82
11.5	J1HH83
10.1	J1FKK5
9.20	J1FKK6
12.2	J1HH84
6.80	J1FKK9
9.20	J1FKL0
13.5	J1FKL1
11.3	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	10.5
Censored		Lognormal mean	10.5
Detection limit or PQL		Std. devn.	1.95
Method detection limit		Median	10.6
TOTAL	12	Min.	6.80
		Max.	13.5

Lognormal distribution? r-squared is: 0.956
Normal distribution? r-squared is: 0.985
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.7

Vanadium 95% UCL Calculation

DATA	ID
36.5	J1HH85/ J1HH86
40.3	J1HH80
48.7	J1HH81
56.4	J1HH82
41.9	J1HH83
33.6	J1FKK5
39.4	J1FKK6
30.5	J1HH84
47.9	J1FKK9
35.4	J1FKL0
40.9	J1FKL1
54.7	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	42.2
Censored		Lognormal mean	42.2
Detection limit or PQL		Std. devn.	8.18
Method detection limit		Median	40.6
TOTAL	12	Min.	30.5
		Max.	56.4

Lognormal distribution? r-squared is: 0.976
Normal distribution? r-squared is: 0.956
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 47.0

Zinc 95% UCL Calculation

DATA	ID
69.0	J1HH85/ J1HH86
39.0	J1HH80
35.5	J1HH81
34.4	J1HH82
38.9	J1HH83
27.4	J1FKK5
31.6	J1FKK6
29.6	J1HH84
30.9	J1FKK9
31.3	J1FKL0
44.7	J1FKL1
46.2	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	38.2
Censored		Lognormal mean	38.2
Detection limit or PQL		Std. devn.	11.3
Method detection limit		Median	35.0
TOTAL	12	Min.	27.4
		Max.	69.0

Lognormal distribution? r-squared is: 0.879
Normal distribution? r-squared is: 0.775
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 43.6

Bis(2-ethylhexyl)phthalate 95% UCL Calculation

DATA	ID
76	J1HH85/ J1HH86
94	J1HH80
80	J1HH81
72	J1HH82
89	J1HH83
24	J1FKK5
24	J1FKK6
78	J1HH84
23	J1FKK9
24	J1FKL0
26	J1FKL1
24	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	53
Censored		Lognormal mean	54
Detection limit or PQL		Std. devn.	31
Method detection limit		Median	49
TOTAL	12	Min.	23
		Max.	94

Lognormal distribution? r-squared is: 0.769
Normal distribution? r-squared is: 0.794
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 67

Fluoride 95% UCL Calculation

DATA	ID
1.1	J1HH85/ J1HH86
0.6	J1HH80
0.7	J1HH81
0.9	J1HH82
1.7	J1HH83
1.0	J1FKK5
1.3	J1FKK6
0.6	J1HH84
0.3	J1FKK9
0.4	J1FKL0
1.1	J1FKL1
1.1	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	0.9
Censored		Lognormal mean	0.9
Detection limit or PQL		Std. devn.	0.4
Method detection limit		Median	1.0
TOTAL	12	Min.	0.3
		Max.	1.7

Lognormal distribution? r-squared is: 0.948
Normal distribution? r-squared is: 0.965
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 1.3

Nitrogen in nitrate 95% UCL Calculation

DATA	ID
2.71	J1HH85/ J1HH86
1.02	J1HH80
55.8	J1HH81
26.7	J1HH82
2.26	J1HH83
7.59	J1FKK5
5.38	J1FKK6
1.13	J1HH84
0.79	J1FKK9
3.19	J1FKL0
4.02	J1FKL1
5.11	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	9.64
Censored		Lognormal mean	9.16
Detection limit or PQL		Std. devn.	16.1
Method detection limit		Median	3.60
TOTAL	12	Min.	0.79
		Max.	55.8

Lognormal distribution? r-squared is: 0.935
Normal distribution? r-squared is: 0.563
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 34.0

Nitrogen in nitrate and nitrite 95% UCL Calculation

DATA	ID
1.66	J1HH85/ J1HH86
0.66	J1HH80
43.4	J1HH81
22.7	J1HH82
1.40	J1HH83
5.36	J1FKK5
5.67	J1FKK6
0.79	J1HH84
0.63	J1FKK9
2.08	J1FKL0
2.94	J1FKL1
4.37	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	7.64
Censored		Lognormal mean	7.43
Detection limit or PQL		Std. devn.	12.8
Method detection limit		Median	2.51
TOTAL	12	Min.	0.63
		Max.	43.4

Lognormal distribution? r-squared is: 0.935
Normal distribution? r-squared is: 0.579
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 31.3

Sulfate 95% UCL Calculation

DATA	ID
8	J1HH85/ J1HH86
5	J1HH80
160	J1HH81
101	J1HH82
8	J1HH83
18	J1FKK5
19	J1FKK6
10	J1HH84
6	J1FKK9
11	J1FKL0
19	J1FKL1
25	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	33
Censored		Lognormal mean	30
Detection limit or PQL		Std. devn.	48
Method detection limit		Median	14
TOTAL	12	Min.	5
		Max.	160

Lognormal distribution? r-squared is: 0.882
Normal distribution? r-squared is: 0.588
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 55.2

TPH-motor oil (high boiling) 95% UCL Calculation

DATA	ID
4575	J1HH85/ J1HH86
5200	J1HH80
5300	J1HH81
5150	J1HH82
9290	J1HH83
5250	J1FKK5
127000	J1FKK6
4230	J1HH84
18700	J1FKK9
6750	J1FKL0
6760	J1FKL1
8670	J1FKL2

Number of samples		Uncensored values	
Uncensored	12	Mean	17240
Censored		Lognormal mean	13175
Detection limit or PQL		Std. devn.	34789
Method detection limit		Median	6025
TOTAL	12	Min.	4230
		Max.	127000

Lognormal distribution? r-squared is: 0.653
Normal distribution? r-squared is: 0.376
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 33760

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Antimony 95% UCL Calculation

DATA	ID
0.366	J19YF8/ J19YH6
0.377	J19YF4
0.437	J19YF5
0.464	J19YF6
0.272	J19YF7
0.426	J19YF9
0.279	J19YH0
0.185	J1FKL6
0.387	J19YH2
0.309	J19YH3
0.491	J19YH4
0.469	J19YH5
0.254	J1B4H9
0.386	J1B4J0
0.274	J1B4J1

Number of samples			
Uncensored	12	Mean	0.358
Censored		Lognormal mean	0.360
Detection limit or PQL		Std. devn.	0.092
Method detection limit		Median	0.377
TOTAL	12	Min.	0.185
		Max.	0.491

Lognormal distribution? r-squared is: 0.930
Normal distribution? r-squared is: 0.961
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.414

Arsenic 95% UCL Calculation

DATA	ID
4.85	J19YF8/ J19YH6
3.27	J19YF4
4.17	J19YF5
6.21	J19YF6
3.96	J19YF7
8.14	J19YF9
5.13	J19YH0
6.50	J1FKL6
3.59	J19YH2
4.77	J19YH3
6.82	J19YH4
5.29	J19YH5
4.23	J1B4H9
4.75	J1B4J0
6.10	J1B4J1

Number of samples			
Uncensored	12	Mean	5.19
Censored		Lognormal mean	5.20
Detection limit or PQL		Std. devn.	1.34
Method detection limit		Median	4.85
TOTAL	12	Min.	3.27
		Max.	8.14

Lognormal distribution? r-squared is: 0.987
Normal distribution? r-squared is: 0.959
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 5.89

Barium 95% UCL Calculation

DATA	ID
49.3	J19YF8/ J19YH6
50.9	J19YF4
51.8	J19YF5
47.8	J19YF6
48.5	J19YF7
54.4	J19YF9
43.1	J19YH0
49.8	J1FKL6
48.7	J19YH2
37.8	J19YH3
67.6	J19YH4
46.4	J19YH5
57.1	J1B4H9
46.2	J1B4J0
57.4	J1B4J1

Number of samples			
Uncensored	12	Mean	50.5
Censored		Lognormal mean	50.5
Detection limit or PQL		Std. devn.	6.91
Method detection limit		Median	49.3
TOTAL	12	Min.	37.8
		Max.	67.6

Lognormal distribution? r-squared is: 0.943
Normal distribution? r-squared is: 0.922
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 53.8

Beryllium 95% UCL Calculation

DATA	ID
0.156	J19YF8/ J19YH6
0.153	J19YF4
0.161	J19YF5
0.169	J19YF6
0.162	J19YF7
0.197	J19YF9
0.149	J19YH0
0.120	J1FKL6
0.136	J19YH2
0.140	J19YH3
0.208	J19YH4
0.175	J19YH5
0.181	J1B4H9
0.147	J1B4J0
0.181	J1B4J1

Number of samples			
Uncensored	12	Mean	0.162
Censored		Lognormal mean	0.162
Detection limit or PQL		Std. devn.	0.023
Method detection limit		Median	0.161
TOTAL	12	Min.	0.120
		Max.	0.208

Lognormal distribution? r-squared is: 0.990
Normal distribution? r-squared is: 0.987
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.174

Boron 95% UCL Calculation

DATA	ID
0.89	J19YF8/ J19YH6
0.85	J19YF4
0.96	J19YF5
0.92	J19YF6
0.90	J19YF7
1.17	J19YF9
0.81	J19YH0
1.30	J1FKL6
0.75	J19YH2
0.84	J19YH3
1.34	J19YH4
1.15	J19YH5
2.55	J1B4H9
1.70	J1B4J0
2.02	J1B4J1

Number of samples			
Uncensored	12	Mean	1.21
Censored		Lognormal mean	1.21
Detection limit or PQL		Std. devn.	0.51
Method detection limit		Median	0.96
TOTAL	12	Min.	0.75
		Max.	2.55

Lognormal distribution? r-squared is: 0.890
Normal distribution? r-squared is: 0.796
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 1.43

Cadmium 95% UCL Calculation

DATA	ID
0.110	J19YF8/ J19YH6
0.090	J19YF4
0.054	J19YF5
0.107	J19YF6
0.105	J19YF7
0.070	J19YF9
0.084	J19YH0
0.064	J1FKL6
0.097	J19YH2
0.117	J19YH3
0.064	J19YH4
0.039	J19YH5
0.068	J1B4H9
0.042	J1B4J0
0.057	J1B4J1

Number of samples			
Uncensored	12	Mean	0.078
Censored		Lognormal mean	0.078
Detection limit or PQL		Std. devn.	0.025
Method detection limit		Median	0.070
TOTAL	12	Min.	0.039
		Max.	0.117

Lognormal distribution? r-squared is: 0.954
Normal distribution? r-squared is: 0.961
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.094

Chromium 95% UCL Calculation

DATA	ID
10.3	J19YF8/ J19YH6
13.2	J19YF4
11.4	J19YF5
10.7	J19YF6
11.7	J19YF7
11.7	J19YF9
9.84	J19YH0
10.6	J1FKL6
9.58	J19YH2
9.93	J19YH3
12.8	J19YH4
11.7	J19YH5
10.3	J1B4H9
11.0	J1B4J0
11.1	J1B4J1

Number of samples			
Uncensored	12	Mean	11.1
Censored		Lognormal mean	11.1
Detection limit or PQL		Std. devn.	1.05
Method detection limit		Median	11.0
TOTAL	12	Min.	9.58
		Max.	13.2

Lognormal distribution? r-squared is: 0.969
Normal distribution? r-squared is: 0.956
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 11.5

Cobalt 95% UCL Calculation

DATA	ID
5.29	J19YF8/ J19YH6
5.37	J19YF4
5.34	J19YF5
5.52	J19YF6
5.15	J19YF7
5.80	J19YF9
4.93	J19YH0
6.10	J1FKL6
4.95	J19YH2
5.27	J19YH3
5.9	J19YH4
5.39	J19YH5
5.36	J1B4H9
4.92	J1B4J0
5.90	J1B4J1

Number of samples			
Uncensored	12	Mean	5.41
Censored		Lognormal mean	5.41
Detection limit or PQL		Std. devn.	0.37
Method detection limit		Median	5.36
TOTAL	12	Min.	4.92
		Max.	6.10

Lognormal distribution? r-squared is: 0.946
Normal distribution? r-squared is: 0.941
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 5.58

Copper 95% UCL Calculation

DATA	ID
12.7	J19YF8/ J19YH6
13.5	J19YF4
14.3	J19YF5
13.5	J19YF6
13.8	J19YF7
13.2	J19YF9
13.4	J19YH0
13.6	J1FKL6
11.7	J19YH2
12.4	J19YH3
14.5	J19YH4
13.4	J19YH5
12.9	J1B4H9
12.2	J1B4J0
13.6	J1B4J1

Number of samples			
Uncensored	12	Mean	13.2
Censored		Lognormal mean	13.2
Detection limit or PQL		Std. devn.	0.76
Method detection limit		Median	13.4
TOTAL	12	Min.	11.7
		Max.	14.5

Lognormal distribution? r-squared is: 0.953
Normal distribution? r-squared is: 0.961
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 13.6

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Hexavalent chromium 95% UCL Calculation

DATA	ID
0.13	J19YF8/ J19YH6
0.15	J19YF4
0.11	J19YF5
0.18	J19YF6
0.15	J19YF7
0.14	J19YF9
0.20	J19YH0
0.18	J1FKL6
0.12	J19YH2
0.17	J19YH3
0.15	J19YH4
0.11	J19YH5
0.10	J1B4H9
0.10	J1B4J0
0.10	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.14
Censored		Lognormal mean	0.14
Detection limit or PQL		Std. devn.	0.03
Method detection limit		Median	0.14
TOTAL	12	Min.	0.10
		Max.	0.20

Lognormal distribution? r-squared is: 0.947
Normal distribution? r-squared is: 0.942
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.16

Lead 95% UCL Calculation

DATA	ID
13.1	J19YF8/ J19YH6
7.0	J19YF4
10.3	J19YF5
17.6	J19YF6
7.4	J19YF7
25.2	J19YF9
16.8	J19YH0
17.9	J1FKL6
8.9	J19YH2
11.3	J19YH3
22.4	J19YH4
14.0	J19YH5
10.5	J1B4H9
12.3	J1B4J0
14.3	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	13.9
Censored		Lognormal mean	14.0
Detection limit or PQL		Std. devn.	5.26
Method detection limit		Median	13.1
TOTAL	12	Min.	6.95
		Max.	25.2

Lognormal distribution? r-squared is: 0.989
Normal distribution? r-squared is: 0.951
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 17.0

Manganese 95% UCL Calculation

DATA	ID
245	J19YF8/ J19YH6
266	J19YF4
259	J19YF5
251	J19YF6
256	J19YF7
272	J19YF9
220	J19YH0
253	J1FKL6
224	J19YH2
244	J19YH3
276	J19YH4
248	J19YH5
250	J1B4H9
227	J1B4J0
262	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	250
Censored		Lognormal mean	250
Detection limit or PQL		Std. devn.	17
Method detection limit		Median	251
TOTAL	12	Min.	220
		Max.	276

Lognormal distribution? r-squared is: 0.950
Normal distribution? r-squared is: 0.960
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 258

Molybdenum 95% UCL Calculation

DATA	ID
0.338	J19YF8/ J19YH6
0.250	J19YF4
0.352	J19YF5
0.232	J19YF6
0.276	J19YF7
0.313	J19YF9
0.227	J19YH0
0.125	J1FKL6
0.167	J19YH2
0.467	J19YH3
0.199	J19YH4
0.209	J19YH5
0.272	J1B4H9
0.308	J1B4J0
0.289	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.268
Censored		Lognormal mean	0.270
Detection limit or PQL		Std. devn.	0.084
Method detection limit		Median	0.272
TOTAL	12	Min.	0.125
		Max.	0.467

Lognormal distribution? r-squared is: 0.969
Normal distribution? r-squared is: 0.961
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.318

Nickel 95% UCL Calculation

DATA	ID
10.9	J19YF8/ J19YH6
10.9	J19YF4
11.0	J19YF5
10.1	J19YF6
10.5	J19YF7
9.82	J19YF9
9.49	J19YH0
10.3	J1FKL6
8.89	J19YH2
9.11	J19YH3
11.6	J19YH4
11.9	J19YH5
9.50	J1B4H9
9.29	J1B4J0
11.8	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	10.3
Censored		Lognormal mean	10.3
Detection limit or PQL		Std. devn.	0.99
Method detection limit		Median	10.3
TOTAL	12	Min.	8.89
		Max.	11.9

Lognormal distribution? r-squared is: 0.969
Normal distribution? r-squared is: 0.966
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 10.8

Vanadium 95% UCL Calculation

DATA	ID
41.0	J19YF8/ J19YH6
41.7	J19YF4
46.4	J19YF5
45.3	J19YF6
43.6	J19YF7
46.5	J19YF9
38.8	J19YH0
42.1	J1FKL6
41.5	J19YH2
39.4	J19YH3
45.5	J19YH4
44.8	J19YH5
45.1	J1B4H9
42.1	J1B4J0
44.9	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	43.2
Censored		Lognormal mean	43.3
Detection limit or PQL		Std. devn.	2.48
Method detection limit		Median	43.6
TOTAL	12	Min.	38.8
		Max.	46.5

Lognormal distribution? r-squared is: 0.939
Normal distribution? r-squared is: 0.943
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 44.4

Zinc 95% UCL Calculation

DATA	ID
31.7	J19YF8/ J19YH6
32.8	J19YF4
41.2	J19YF5
33.3	J19YF6
33.2	J19YF7
39.0	J19YF9
55.3	J19YH0
34.3	J1FKL6
30.1	J19YH2
29.4	J19YH3
44.4	J19YH4
33.1	J19YH5
59.6	J1B4H9
37.0	J1B4J0
49.4	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	38.9
Censored		Lognormal mean	38.9
Detection limit or PQL		Std. devn.	9.34
Method detection limit		Median	34.3
TOTAL	12	Min.	29.4
		Max.	59.6

Lognormal distribution? r-squared is: 0.901
Normal distribution? r-squared is: 0.857
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 43.4

Benzo(a)anthracene 95% UCL Calculation

DATA	ID
4.98	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
0.97	J19YF6
0.92	J19YF7
4.65	J19YF9
55.5	J19YH0
18.0	J1FKL6
94.5	J19YH2
13.3	J19YH3
21.3	J19YH4
13.7	J19YH5
10.2	J1B4H9
6.98	J1B4J0
22.3	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	18.0
Censored		Lognormal mean	21.5
Detection limit or PQL		Std. devn.	25.3
Method detection limit		Median	10.2
TOTAL	12	Min.	0.92
		Max.	94.5

Lognormal distribution? r-squared is: 0.968
Normal distribution? r-squared is: 0.660
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 78.5

Benzo(a)pyrene 95% UCL Calculation

DATA	ID
5.82	J19YF8/ J19YH6
1.68	J19YF4
1.24	J19YF5
1.70	J19YF6
1.44	J19YF7
7.63	J19YF9
68.8	J19YH0
17.0	J1FKL6
85.3	J19YH2
11.9	J19YH3
57.4	J19YH4
12.8	J19YH5
7.41	J1B4H9
5.72	J1B4J0
18.9	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	20.3
Censored		Lognormal mean	23.3
Detection limit or PQL		Std. devn.	27.1
Method detection limit		Median	7.63
TOTAL	12	Min.	1.24
		Max.	85.3

Lognormal distribution? r-squared is: 0.950
Normal distribution? r-squared is: 0.706
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 83.1

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Ecology Software (MTCAStat) Results, 116-H-5 Overburden

Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
8.15	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
1.44	J19YF6
1.07	J19YF7
9.71	J19YF9
71.0	J19YH0
18.0	J1FKL6
84.1	J19YH2
11.7	J19YH3
53.5	J19YH4
17.0	J19YH5
15.4	J1B4H9
8.78	J1B4J0
27.5	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	22.0
Censored		Lognormal mean	28.2
Detection limit or PQL		Std. devn.	26.3
Method detection limit		Median	11.7
TOTAL	12	Min.	1.07
		Max.	84.1

Lognormal distribution? r-squared is: 0.941
Normal distribution? r-squared is: 0.764
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 105

Benzo(ghi)perylene 95% UCL Calculation

DATA	ID
3.96	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
1.56	J19YF6
0.84	J19YF7
9.53	J19YF9
36.8	J19YH0
3.70	J1FKL6
64.5	J19YH2
9.20	J19YH3
98.0	J19YH4
9.28	J19YH5
4.40	J1B4H9
4.07	J1B4J0
11.6	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	17.4
Censored		Lognormal mean	17.5
Detection limit or PQL		Std. devn.	28.1
Method detection limit		Median	4.40
TOTAL	12	Min.	0.84
		Max.	98.0

Lognormal distribution? r-squared is: 0.946
Normal distribution? r-squared is: 0.610
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 62.9

Benzo(k)fluoranthene 95% UCL Calculation

DATA	ID
3.02	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
1.68	J19YF6
1.64	J19YF7
3.92	J19YF9
30.4	J19YH0
9.20	J1FKL6
43.5	J19YH2
6.08	J19YH3
22.1	J19YH4
6.11	J19YH5
3.40	J1B4H9
2.53	J1B4J0
7.86	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	9.65
Censored		Lognormal mean	9.46
Detection limit or PQL		Std. devn.	12.5
Method detection limit		Median	3.92
TOTAL	12	Min.	1.63
		Max.	43.5

Lognormal distribution? r-squared is: 0.915
Normal distribution? r-squared is: 0.679
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 21.9

Chrysene 95% UCL Calculation

DATA	ID
2.47	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
1.68	J19YF6
1.46	J19YF7
5.51	J19YF9
39.9	J19YH0
16.0	J1FKL6
160	J19YH2
34.1	J19YH3
17.3	J19YH4
23.7	J19YH5
18.7	J1B4H9
8.23	J1B4J0
32.5	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	24.3
Censored		Lognormal mean	28.2
Detection limit or PQL		Std. devn.	39.7
Method detection limit		Median	16.0
TOTAL	12	Min.	1.46
		Max.	160

Lognormal distribution? r-squared is: 0.928
Normal distribution? r-squared is: 0.547
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 113

Dibenz[a,h]anthracene 95% UCL Calculation

DATA	ID
1.26	J19YF8/ J19YH6
1.68	J19YF4
1.63	J19YF5
1.68	J19YF6
1.64	J19YF7
1.4	J19YF9
8.73	J19YH0
5.50	J1FKL6
19.0	J19YH2
2.49	J19YH3
10.8	J19YH4
1.60	J19YH5
1.67	J1B4H9
1.67	J1B4J0
1.49	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	4.15
Censored		Lognormal mean	3.87
Detection limit or PQL		Std. devn.	5.05
Method detection limit		Median	1.67
TOTAL	12	Min.	1.26
		Max.	19.0

Lognormal distribution? r-squared is: 0.738
Normal distribution? r-squared is: 0.607
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 6.29

Fluoranthene 95% UCL Calculation

DATA	ID
15.1	J19YF8/ J19YH6
3.98	J19YF4
1.39	J19YF5
6.45	J19YF6
6.55	J19YF7
15.3	J19YF9
161	J19YH0
6.50	J1FKL6
269	J19YH2
29.1	J19YH3
54.6	J19YH4
29.5	J19YH5
24.6	J1B4H9
17.9	J1B4J0
65.9	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	47.1
Censored		Lognormal mean	51.8
Detection limit or PQL		Std. devn.	73.5
Method detection limit		Median	17.9
TOTAL	12	Min.	1.39
		Max.	269

Lognormal distribution? r-squared is: 0.980
Normal distribution? r-squared is: 0.614
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 188

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

DATA	ID
4.87	J19YF8/ J19YH6
0.84	J19YF4
1.08	J19YF5
1.56	J19YF6
1.18	J19YF7
7.89	J19YF9
42.40	J19YH0
14.00	J1FKL6
71.30	J19YH2
12.80	J19YH3
68.8	J19YH4
9.37	J19YH5
8.95	J1B4H9
5.05	J1B4J0
16.5	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	17.8
Censored		Lognormal mean	21.6
Detection limit or PQL		Std. devn.	23.6
Method detection limit		Median	8.95
TOTAL	12	Min.	0.84
		Max.	71.3

Lognormal distribution? r-squared is: 0.955
Normal distribution? r-squared is: 0.701
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 83.4

Phenanthrene 95% UCL Calculation

DATA	ID
4.93	J19YF8/ J19YH6
1.31	J19YF4
1.19	J19YF5
1.38	J19YF6
1.61	J19YF7
4.49	J19YF9
86.9	J19YH0
15.0	J1FKL6
201	J19YH2
11.3	J19YH3
14.1	J19YH4
10.4	J19YH5
7.35	J1B4H9
6.48	J1B4J0
26.8	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	26.3
Censored		Lognormal mean	25.1
Detection limit or PQL		Std. devn.	52.9
Method detection limit		Median	7.35
TOTAL	12	Min.	1.19
		Max.	201

Lognormal distribution? r-squared is: 0.940
Normal distribution? r-squared is: 0.491
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 107

Pyrene 95% UCL Calculation

DATA	ID
12.2	J19YF8/ J19YH6
1.44	J19YF4
1.27	J19YF5
3.14	J19YF6
2.38	J19YF7
9.1	J19YF9
176	J19YH0
34.0	J1FKL6
290	J19YH2
39.6	J19YH3
51.9	J19YH4
28.7	J19YH5
18	J1B4H9
13.8	J1B4J0
49.6	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	48.8
Censored		Lognormal mean	63.1
Detection limit or PQL		Std. devn.	79.7
Method detection limit		Median	18.3
TOTAL	12	Min.	1.27
		Max.	290

Lognormal distribution? r-squared is: 0.970
Normal distribution? r-squared is: 0.600
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 342

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Ecology Software (MTCAStat) Results, 116-H-5 Overburden

Fluoride 95% UCL Calculation

DATA	ID
0.7	J19YF8/ J19YH6
0.7	J19YF4
0.7	J19YF5
0.7	J19YF6
0.6	J19YF7
0.8	J19YF9
0.8	J19YH0
1.1	J1FKL6
0.7	J19YH2
0.6	J19YH3
1.0	J19YH4
0.7	J19YH5
0.5	J1B4H9
0.7	J1B4J0
0.3	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	0.7
Censored		Lognormal mean	0.7
Detection limit or PQL		Std. devn.	0.2
Method detection limit		Median	0.7
TOTAL	12	Min.	0.3
		Max.	1.1

Lognormal distribution? r-squared is: 0.839
Normal distribution? r-squared is: 0.895
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 0.8

Nitrogen in nitrate 95% UCL Calculation

DATA	ID
0.8	J19YF8/ J19YH6
0.3	J19YF4
0.3	J19YF5
1.3	J19YF6
0.5	J19YF7
1.6	J19YF9
0.3	J19YH0
1.0	J1FKL6
0.5	J19YH2
2.5	J19YH3
0.9	J19YH4
0.9	J19YH5
5.1	J1B4H9
3.1	J1B4J0
3.2	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	1.5
Censored		Lognormal mean	1.5
Detection limit or PQL		Std. devn.	1.4
Method detection limit		Median	0.9
TOTAL	12	Min.	0.3
		Max.	5.1

Lognormal distribution? r-squared is: 0.966
Normal distribution? r-squared is: 0.813
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 3.0

Nitrogen in nitrate and nitrite 95% UCL Calculation

DATA	ID
0.7	J19YF8/ J19YH6
0.6	J19YF4
0.3	J19YF5
1.4	J19YF6
0.6	J19YF7
1.3	J19YF9
1.3	J19YH0
0.8	J1FKL6
0.7	J19YH2
2.5	J19YH3
1.0	J19YH4
1.0	J19YH5
4.6	J1B4H9
3.0	J1B4J0
2.9	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	1.5
Censored		Lognormal mean	1.5
Detection limit or PQL		Std. devn.	1.2
Method detection limit		Median	1.0
TOTAL	12	Min.	0.3
		Max.	4.6

Lognormal distribution? r-squared is: 0.967
Normal distribution? r-squared is: 0.812
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 2.4

Sulfate 95% UCL Calculation

DATA	ID
5.9	J19YF8/ J19YH6
2.9	J19YF4
6.4	J19YF5
6.6	J19YF6
4.3	J19YF7
14	J19YF9
8.8	J19YH0
6.9	J1FKL6
3.0	J19YH2
7.7	J19YH3
7.4	J19YH4
3.8	J19YH5
6.4	J1B4H9
5.4	J1B4J0
8.0	J1B4J1

Number of samples		Uncensored values	
Uncensored	12	Mean	6.5
Censored		Lognormal mean	6.6
Detection limit or PQL		Std. devn.	2.8
Method detection limit		Median	6.4
TOTAL	12	Min.	2.9
		Max.	14

Lognormal distribution? r-squared is: 0.945
Normal distribution? r-squared is: 0.870
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 8.2

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

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Ecology Software (MTCAStat) Results, 116-H-5 Staging Pile Area

Arsenic 95% UCL Calculation

DATA	ID
1.9	J1FKM0/ J1FKM9
2.2	J1FKL7
1.7	J1FKL8
1.5	J1FKL9
7.8	J1FKM1
9.1	J1FKM2
14.1	J1FKM3
6.7	J1FKM4
12.2	J1FKM5
3.4	J1FKM6
2.2	J1FKM7
14.2	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	6.4
Censored		Lognormal mean	6.8
Detection limit or PQL		Std. devn.	5.0
Method detection limit		Median	5.1
TOTAL	12	Min.	1.5
		Max.	14.2

Lognormal distribution? r-squared is: 0.901
Normal distribution? r-squared is: 0.871
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 14.0

Barium 95% UCL Calculation

DATA	ID
34.7	J1FKM0/ J1FKM9
36.4	J1FKL7
33.5	J1FKL8
37.3	J1FKL9
88.8	J1FKM1
60.5	J1FKM2
126	J1FKM3
68.3	J1FKM4
82.9	J1FKM5
40.6	J1FKM6
43.0	J1FKM7
72.5	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	60.4
Censored		Lognormal mean	60.6
Detection limit or PQL		Std. devn.	28.6
Method detection limit		Median	51.8
TOTAL	12	Min.	33.5
		Max.	126

Lognormal distribution? r-squared is: 0.920
Normal distribution? r-squared is: 0.866
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 80.0

Beryllium 95% UCL Calculation

DATA	ID
0.080	J1FKM0/ J1FKM9
0.089	J1FKL7
0.079	J1FKL8
0.069	J1FKL9
0.15	J1FKM1
0.15	J1FKM2
0.17	J1FKM3
0.10	J1FKM4
0.22	J1FKM5
0.047	J1FKM6
0.028	J1FKM7
0.16	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	0.11
Censored		Lognormal mean	0.12
Detection limit or PQL		Std. devn.	0.057
Method detection limit		Median	0.095
TOTAL	12	Min.	0.028
		Max.	0.22

Lognormal distribution? r-squared is: 0.944
Normal distribution? r-squared is: 0.956
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.17

Boron 95% UCL Calculation

DATA	ID
0.47	J1FKM0/ J1FKM9
0.88	J1FKL7
0.48	J1FKL8
0.43	J1FKL9
6.9	J1FKM1
2.1	J1FKM2
1.7	J1FKM3
1.2	J1FKM4
1.4	J1FKM5
0.48	J1FKM6
0.42	J1FKM7
1.8	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	1.52
Censored		Lognormal mean	1.48
Detection limit or PQL		Std. devn.	1.80
Method detection limit		Median	1.04
TOTAL	12	Min.	0.42
		Max.	6.90

Lognormal distribution? r-squared is: 0.884
Normal distribution? r-squared is: 0.598
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 2.4

Cadmium 95% UCL Calculation

DATA	ID
0.067	J1FKM0/ J1FKM9
0.043	J1FKL7
0.049	J1FKL8
0.077	J1FKL9
0.15	J1FKM1
0.11	J1FKM2
0.12	J1FKM3
0.10	J1FKM4
0.14	J1FKM5
0.059	J1FKM6
0.077	J1FKM7
0.12	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	0.093
Censored		Lognormal mean	0.094
Detection limit or PQL		Std. devn.	0.036
Method detection limit		Median	0.089
TOTAL	12	Min.	0.043
		Max.	0.15

Lognormal distribution? r-squared is: 0.963
Normal distribution? r-squared is: 0.965
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.12

Chromium 95% UCL Calculation

DATA	ID
9.20	J1FKM0/ J1FKM9
9.20	J1FKL7
9.40	J1FKL8
6.10	J1FKL9
11.0	J1FKM1
9.60	J1FKM2
11.9	J1FKM3
10.5	J1FKM4
13.1	J1FKM5
9.40	J1FKM6
9.40	J1FKM7
11.6	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	10.0
Censored		Lognormal mean	10.1
Detection limit or PQL		Std. devn.	1.78
Method detection limit		Median	9.50
TOTAL	12	Min.	6.10
		Max.	13.1

Lognormal distribution? r-squared is: 0.845
Normal distribution? r-squared is: 0.900
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 11.0

Cobalt 95% UCL Calculation

DATA	ID
5.0	J1FKM0/ J1FKM9
4.9	J1FKL7
5.2	J1FKL8
4.5	J1FKL9
6.3	J1FKM1
6.0	J1FKM2
7.2	J1FKM3
7.2	J1FKM4
7.9	J1FKM5
6.7	J1FKM6
6.8	J1FKM7
6.8	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	6.2
Censored		Lognormal mean	6.2
Detection limit or PQL		Std. devn.	1.1
Method detection limit		Median	6.5
TOTAL	12	Min.	4.5
		Max.	7.9

Lognormal distribution? r-squared is: 0.936
Normal distribution? r-squared is: 0.950
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 6.9

Copper 95% UCL Calculation

DATA	ID
11.9	J1FKM0/ J1FKM9
11.3	J1FKL7
12.1	J1FKL8
12.5	J1FKL9
15.9	J1FKM1
13.5	J1FKM2
15.6	J1FKM3
17.0	J1FKM4
14.9	J1FKM5
14.0	J1FKM6
12.9	J1FKM7
14.0	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	13.8
Censored		Lognormal mean	13.8
Detection limit or PQL		Std. devn.	1.78
Method detection limit		Median	13.8
TOTAL	12	Min.	11.3
		Max.	17.0

Lognormal distribution? r-squared is: 0.983
Normal distribution? r-squared is: 0.975
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 14.8

Lead 95% UCL Calculation

DATA	ID
2.55	J1FKM0/ J1FKM9
2.00	J1FKL7
2.10	J1FKL8
2.30	J1FKL9
30.7	J1FKM1
35.3	J1FKM2
70.5	J1FKM3
20.0	J1FKM4
32.7	J1FKM5
5.50	J1FKM6
2.30	J1FKM7
58.5	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	22.0
Censored		Lognormal mean	28.5
Detection limit or PQL		Std. devn.	23.9
Method detection limit		Median	12.8
TOTAL	12	Min.	2.00
		Max.	70.5

Lognormal distribution? r-squared is: 0.857
Normal distribution? r-squared is: 0.835
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 33.4

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie	**Date** 05/17/11	**Calc. No.** 0100H-CA-V0164	**Rev. No.** 0
Project 100-H Field Remediation	**Job No.** 14655	**Checked** T. E. Queen	**Date** 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 41 of 47

Ecology Software (MTCAStat) Results, 116-H-5 Staging Pile Area

Manganese 95% UCL Calculation

DATA	ID
224	J1FKM0/ J1FKM9
218	J1FKL7
231	J1FKL8
182	J1FKL9
254	J1FKM1
252	J1FKM2
300	J1FKM3
286	J1FKM4
362	J1FKM5
230	J1FKM6
241	J1FKM7
294	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	256
Censored		Lognormal mean	256
Detection limit or PQL		Std. devn.	48
Method detection limit		Median	247
TOTAL	12	Min.	182
		Max.	362

Lognormal distribution? r-squared is: 0.959
Normal distribution? r-squared is: 0.931
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 283

Nickel 95% UCL Calculation

DATA	ID
9.30	J1FKM0/ J1FKM9
9.40	J1FKL7
10.5	J1FKL8
7.00	J1FKL9
10.8	J1FKM1
9.50	J1FKM2
11.2	J1FKM3
9.70	J1FKM4
12.8	J1FKM5
10.2	J1FKM6
8.00	J1FKM7
10.6	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	9.92
Censored		Lognormal mean	9.93
Detection limit or PQL		Std. devn.	1.50
Method detection limit		Median	9.95
TOTAL	12	Min.	7.00
		Max.	12.8

Lognormal distribution? r-squared is: 0.934
Normal distribution? r-squared is: 0.954
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 10.8

Vanadium 95% UCL Calculation

DATA	ID
36.9	J1FKM0/ J1FKM9
36.8	J1FKL7
38.4	J1FKL8
36.4	J1FKL9
41.1	J1FKM1
36.1	J1FKM2
46.4	J1FKM3
59.2	J1FKM4
45.4	J1FKM5
49.8	J1FKM6
53.3	J1FKM7
45.8	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	43.8
Censored		Lognormal mean	43.8
Detection limit or PQL		Std. devn.	7.53
Method detection limit		Median	43.3
TOTAL	12	Min.	36.1
		Max.	59.2

Lognormal distribution? r-squared is: 0.922
Normal distribution? r-squared is: 0.907
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 48.0

Zinc 95% UCL Calculation

DATA	ID
28.3	J1FKM0/ J1FKM9
26.4	J1FKL7
27.9	J1FKL8
25.7	J1FKL9
40.6	J1FKM1
36.4	J1FKM2
44.8	J1FKM3
44.6	J1FKM4
48.6	J1FKM5
32.8	J1FKM6
32.9	J1FKM7
43.5	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	36.0
Censored		Lognormal mean	36.1
Detection limit or PQL		Std. devn.	8.15
Method detection limit		Median	34.7
TOTAL	12	Min.	25.7
		Max.	48.6

Lognormal distribution? r-squared is: 0.935
Normal distribution? r-squared is: 0.934
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 41.1

Benzo(a)anthracene 95% UCL Calculation

DATA	ID
200	J1FKM0/ J1FKM9
1.7	J1FKL7
1.7	J1FKL8
25	J1FKL9
19	J1FKM1
21	J1FKM2
22	J1FKM3
31	J1FKM4
8.9	J1FKM5
1.6	J1FKM6
1.6	J1FKM7
44	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	31
Censored		Lognormal mean	40
Detection limit or PQL		Std. devn.	55
Method detection limit		Median	20
TOTAL	12	Min.	1.6
		Max.	200

Lognormal distribution? r-squared is: 0.890
Normal distribution? r-squared is: 0.520
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 58

Benzo(a)pyrene 95% UCL Calculation

DATA	ID
145	J1FKM0/ J1FKM9
3.3	J1FKL7
6.8	J1FKL8
17	J1FKL9
22	J1FKM1
27	J1FKM2
37	J1FKM3
25	J1FKM4
10	J1FKM5
3.2	J1FKM6
3.3	J1FKM7
27	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	27
Censored		Lognormal mean	28
Detection limit or PQL		Std. devn.	39
Method detection limit		Median	20
TOTAL	12	Min.	3.2
		Max.	145

Lognormal distribution? r-squared is: 0.927
Normal distribution? r-squared is: 0.567
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 88.5

Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
165	J1FKM0/ J1FKM9
2.2	J1FKL7
2.2	J1FKL8
20	J1FKL9
25	J1FKM1
20	J1FKM2
20	J1FKM3
21	J1FKM4
2.3	J1FKM5
2.1	J1FKM6
2.2	J1FKM7
37	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	27
Censored		Lognormal mean	30
Detection limit or PQL		Std. devn.	45
Method detection limit		Median	20
TOTAL	12	Min.	2.1
		Max.	165

Lognormal distribution? r-squared is: 0.842
Normal distribution? r-squared is: 0.519
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 48

Benzo(k)fluoranthene 95% UCL Calculation

DATA	ID
78	J1FKM0/ J1FKM9
2.1	J1FKL7
2.1	J1FKL8
11	J1FKL9
9.8	J1FKM1
10	J1FKM2
8.9	J1FKM3
9.7	J1FKM4
2.2	J1FKM5
1.9	J1FKM6
2.0	J1FKM7
14	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	13
Censored		Lognormal mean	12
Detection limit or PQL		Std. devn.	21
Method detection limit		Median	9.3
TOTAL	12	Min.	1.9
		Max.	78

Lognormal distribution? r-squared is: 0.835
Normal distribution? r-squared is: 0.477
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 23

Chrysene 95% UCL Calculation

DATA	ID
150	J1FKM0/ J1FKM9
2.5	J1FKL7
2.5	J1FKL8
27	J1FKL9
21	J1FKM1
24	J1FKM2
26	J1FKM3
29	J1FKM4
8.7	J1FKM5
2.4	J1FKM6
2.5	J1FKM7
35	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	28
Censored		Lognormal mean	32
Detection limit or PQL		Std. devn.	40
Method detection limit		Median	23
TOTAL	12	Min.	2.4
		Max.	150

Lognormal distribution? r-squared is: 0.877
Normal distribution? r-squared is: 0.568
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 47

CALCULATION SHEET

Washington Closure Hanford

Originator	J. D. Skoglie	Date 05/17/11	Calc. No. 0100H-CA-V0164
Project	100-H Field Remediation	Job No. 14655	Checked T. E. Queen
Subject	116-H-5 Waste Site Cleanup Verification 95% UCL Calculations		

Rev. No. 0
Date 05/17/11
Sheet No. 42 of 47

Ecology Software (MTCAStat) Results, 116-H-5 Staging Pile Area

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

DATA	ID
115	J1FKM0/ J1FKM9
6.0	J1FKL7
6.0	J1FKL8
12	J1FKL9
16	J1FKM1
21	J1FKM2
17	J1FKM3
20	J1FKM4
6.5	J1FKM5
6.0	J1FKM6
6.0	J1FKM7
27	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	22
Censored		Lognormal mean	20
Detection limit or PQL		Std. devn.	30
Method detection limit		Median	14
TOTAL	12	Min.	6.0
		Max.	115

Lognormal distribution? r-squared is: 0.837
Normal distribution? r-squared is: 0.506
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 36

Phenanthrene 95% UCL Calculation

DATA	ID
185	J1FKM0/ J1FKM9
6.0	J1FKL7
6.0	J1FKL8
13	J1FKL9
6.0	J1FKM1
19	J1FKM2
17	J1FKM3
32	J1FKM4
6.5	J1FKM5
6.0	J1FKM6
6.0	J1FKM7
14	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	26
Censored		Lognormal mean	21
Detection limit or PQL		Std. devn.	51
Method detection limit		Median	10
TOTAL	12	Min.	6.0
		Max.	185

Lognormal distribution? r-squared is: 0.755
Normal distribution? r-squared is: 0.419
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 50

Pyrene 95% UCL Calculation

DATA	ID
350	J1FKM0/ J1FKM9
6.0	J1FKL7
6.0	J1FKL8
54	J1FKL9
30	J1FKM1
51	J1FKM2
54	J1FKM3
70	J1FKM4
21	J1FKM5
6.0	J1FKM6
6.0	J1FKM7
65	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	60
Censored		Lognormal mean	65
Detection limit or PQL		Std. devn.	95
Method detection limit		Median	41
TOTAL	12	Min.	6.0
		Max.	350

Lognormal distribution? r-squared is: 0.886
Normal distribution? r-squared is: 0.531
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 105

Bis(2-ethylhexyl)phthalate 95% UCL Calculation

DATA	ID
110	J1FKM0/ J1FKM9
110	J1FKL7
110	J1FKL8
100	J1FKL9
130	J1FKM1
130	J1FKM2
120	J1FKM3
120	J1FKM4
120	J1FKM5
110	J1FKM6
110	J1FKM7
130	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	117
Censored		Lognormal mean	117
Detection limit or PQL		Std. devn.	10
Method detection limit		Median	115
TOTAL	12	Min.	100
		Max.	130

Lognormal distribution? r-squared is: 0.889
Normal distribution? r-squared is: 0.887
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 121

Fluoride 95% UCL Calculation

DATA	ID
0.41	J1FKM0/ J1FKM9
0.42	J1FKL7
0.41	J1FKL8
0.43	J1FKL9
0.43	J1FKM1
0.95	J1FKM2
1.1	J1FKM3
1.8	J1FKM4
0.96	J1FKM5
0.88	J1FKM6
1.1	J1FKM7
0.97	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	0.82
Censored		Lognormal mean	0.83
Detection limit or PQL		Std. devn.	0.42
Method detection limit		Median	0.92
TOTAL	12	Min.	0.41
		Max.	1.80

Lognormal distribution? r-squared is: 0.850
Normal distribution? r-squared is: 0.835
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 1.0

Nitrogen in nitrate 95% UCL Calculation

DATA	ID
0.42	J1FKM0/ J1FKM9
0.35	J1FKL7
0.36	J1FKL8
0.36	J1FKL9
40.1	J1FKM1
44.8	J1FKM2
0.61	J1FKM3
0.94	J1FKM4
0.55	J1FKM5
0.41	J1FKM6
1.1	J1FKM7
0.76	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	7.6
Censored		Lognormal mean	5.1
Detection limit or PQL		Std. devn.	16
Method detection limit		Median	0.6
TOTAL	12	Min.	0.4
		Max.	45

Lognormal distribution? r-squared is: 0.657
Normal distribution? r-squared is: 0.48
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 15.3

Nitrogen in nitrate and nitrite 95% UCL Calculation

DATA	ID
0.18	J1FKM0/ J1FKM9
0.18	J1FKL7
0.19	J1FKL8
0.19	J1FKL9
39.9	J1FKM1
50.9	J1FKM2
0.43	J1FKM3
0.85	J1FKM4
0.46	J1FKM5
0.18	J1FKM6
1.1	J1FKM7
0.62	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	7.9
Censored		Lognormal mean	5.8
Detection limit or PQL		Std. devn.	18
Method detection limit		Median	0.4
TOTAL	12	Min.	0.2
		Max.	51

Lognormal distribution? r-squared is: 0.732
Normal distribution? r-squared is: 0.487
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 16

Sulfate 95% UCL Calculation

DATA	ID
1.8	J1FKM0/ J1FKM9
2.1	J1FKL7
0.85	J1FKL8
2.0	J1FKL9
43.6	J1FKM1
18.2	J1FKM2
2.0	J1FKM3
55.6	J1FKM4
2.8	J1FKM5
5.4	J1FKM6
9.1	J1FKM7
3.3	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	12.2
Censored		Lognormal mean	12.3
Detection limit or PQL		Std. devn.	18.3
Method detection limit		Median	3.05
TOTAL	12	Min.	0.85
		Max.	55.6

Lognormal distribution? r-squared is: 0.906
Normal distribution? r-squared is: 0.652
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 51.6

TPH - diesel range 95% UCL Calculation

DATA	ID
4550	J1FKM0/ J1FKM9
345	J1FKL7
320	J1FKL8
345	J1FKL9
11000	J1FKM1
8500	J1FKM2
9500	J1FKM3
7100	J1FKM4
4400	J1FKM5
820	J1FKM6
345	J1FKM7
4000	J1FKM8

Number of samples		Uncensored values	
Uncensored	12	Mean	4269
Censored		Lognormal mean	6158
Detection limit or PQL		Std. devn.	3959
Method detection limit		Median	4200
TOTAL	12	Min.	320
		Max.	11000

Lognormal distribution? r-squared is: 0.841
Normal distribution? r-squared is: 0.891
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 6149

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

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Ecology Software (MTCAStat) Results, 116-H-5 Overburden

	DATA	ID	TPH-diesel range EXT 95% UCL Calculation				DATA	ID	TPH-motor oil (high boiling) 95% UCL Calculation			
1	DATA	ID	TPH-diesel range EXT 95% UCL Calculation				DATA	ID	TPH-motor oil (high boiling) 95% UCL Calculation			
2	10350	J1FKM0/ J1FKM9					52850	J19YJ4/ J19YJ9				
3	500	J1FKL7					184000	J19YH7				
4	470	J1FKL8	Number of samples		Uncensored values		17400	J19YH8	Number of samples		Uncensored values	
5	500	J1FKL9	Uncensored	12	Mean	12410	10400	J19YH9	Uncensored	12	Mean	54368
6	41000	J1FKM1	Censored		Lognormal mean	21532	8660	J19YJ0	Censored		Lognormal mean	58228
7	30000	J1FKM2	Detection limit or PQL		Std. devn.	14620	14900	J19YJ1	Detection limit or PQL		Std. devn.	55168
8	35000	J1FKM3	Method detection limit		Median	8250	141000	J19YJ2	Method detection limit		Median	45975
9	12000	J1FKM4	TOTAL	12	Min.	470	10500	J19YJ3	TOTAL	12	Min.	8660
10	7700	J1FKM5			Max.	41000	60800	J19YJ5			Max.	184000
11	2100	J1FKM6					58900	J19YJ6				
12	500	J1FKM7					39100	J19YJ7				
13	8800	J1FKM8					53900	J19YJ8				
14												
15			Lognormal distribution?		Normal distribution?				Lognormal distribution?		Normal distribution?	
16			r-squared is: 0.880		r-squared is: 0.807				r-squared is: 0.937		r-squared is: 0.782	
17			Recommendations:						Recommendations:			
18			Reject BOTH lognormal and normal distributions						Use lognormal distribution.			
19												
20			UCL (based on Z-statistic) is		19353				UCL (Land's method) is		147061	
21												

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie **Date** 05/17/11 **Calc. No.** 0100H-CA-V0164 **Rev. No.** 0

Project 100-H Field Remediation **Job No.** 14655 **Checked** T. E. Queen **Date** 05/17/11

Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 44 of 47

Duplicate Analysis - 116-H-5 Waste Site Shallow Zone

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Thorium-228 GEA			Thorium-232 GEA			Uranium-233/234			Uranium-238			Aluminum			Arsenic		
			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	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	14.6		0.54	0.683		0.148	1.17		0.266	0.977		0.102	1.17		0.266	0.770		0.226	0.681		0.226	8400		18.1	4.27		0.907
Duplicate of J19YB9	J19YD0	5/18/10	13.0		0.676	0.670		0.154	1.09		0.371	0.965		0.097	1.09		0.371	0.930		0.178	0.768		0.178	7600		13.9	3.99		0.695

Analysis:

	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)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	11.6%	1.9%	7.1%					10.0%	
	Difference > 2 TDL?	Not applicable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Barium			Beryllium			Boron			Calcium			Chromium			Cobalt			Copper			Iron			Lead		
			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
SZ-2	J19YB9	5/18/10	67.8		0.453	0.263		0.181	1.22	B	1.81	4240		18.1	21.2		0.907	6.33		2.72	12.5		1.81	21700		18.1	4.66		0.907
Duplicate of J19YB9	J19YD0	5/18/10	60.1		0.348	0.232		0.139	1.11	B	1.39	4040		13.9	15.9		0.695	5.42		2.09	11.4		1.39	18700		13.9	5.41		0.695

Analysis:

	TDL	2	0.2	2	100	1	2	1	5	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)		Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	12.0%			4.8%	28.6%		9.2%	14.9%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Magnesium			Manganese			Molybdenum			Nickel			Potassium			Silicon			Sodium			Vanadium			Zinc		
			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
SZ-2	J19YB9	5/18/10	4670		4.53	278		0.907	0.294	B	0.907	15.6		2.27	1200		90.7	571		5.44	165		45.3	52.6		0.91	37.8		2.72
Duplicate of J19YB9	J19YD0	5/18/10	4110		3.48	256		0.695	0.243	B	0.695	12.2		1.74	1100		69.5	512		4.17	147		34.8	43.7		0.70	33.9		2.09

Analysis:

	TDL	75	5	2	4	400	2	50	2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)		No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	12.8%	8.2%				10.9%		18.5%	10.9%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Benzo(b)fluoranthene (Method 8310)			Phenanthrene (Method 8310)			Fluoride			Nitrogen in nitrate *			Nitrogen in nitrate and nitrite			Phosphorous in phosphate			Sulfate		
			ug/kg	Q	PQL	ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	1.16	J	3.87	1.16	J	3.87	0.7	B	2.8	0.59	JB	0.63	0.49		0.22	1.3	J	0.9	2.6	B	2.8
Duplicate of J19YB9	J19YD0	5/18/10	1.54	J	3.43	1.20	J	3.43	0.8	B	2.5	0.84		0.56	0.62		0.19	4.2		2.5	3.2		2.5

Analysis:

	TDL	15	15	5	0.75	0.75	5	5
Duplicate Analysis	Both > PQL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?					No-Stop (acceptable)	No-Stop (acceptable)	
	RPD							
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-H Field Remediation
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations

Date 05/17/11
Job No. 14655

Calc. No. 0100H-CA-V0164
Checked T. E. Queen

Rev. No. 0
Date 05/17/11
Sheet No. 45 of 47

Duplicate Analysis - 116-H-5 Waste Site Deep Zone

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Thorium-228 GEA			Thorium-232 GEA			Uranium-233/234			Uranium-238		
			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
DZ-1	J19YD1	5/18/10	15.1		0.78	0.502		0.135	0.800		0.302	0.668		0.086	0.800		0.302	0.766		0.279	0.620		0.279
Duplicate of J19YD1	J19YF3	5/18/10	15.1		0.852	0.576		0.128	0.539		0.333	0.731		0.086	0.539		0.333	0.567		0.181	0.543		0.181

Analysis:

TDL		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)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	0.0%	13.7%					
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Cadmium			Calcium			Chromium			Cobalt			Copper		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
DZ-8 re-sample 2[a]	J1HH85	4/13/11	6430		1.4	6.0		0.60	43.4		0.069	0.12	B	0.030	0.14	B	0.037	5170		12.9	12.8		0.053	5.3	X	0.091	18.5		0.20
Duplicate of J1HH85[a]	J1HH86	4/13/11	6810		1.5	6.7		0.64	42.1		0.074	0.13	B	0.032	0.19		0.040	4840		13.7	15.1		0.056	5.4	X	0.097	16.2		0.21

Analysis:

TDL		5	10	2	0.2	0.2	100	1	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	5.7%		3.0%			6.6%	16.5%		13.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Iron			Lead			Magnesium			Manganese			Mercury			Nickel			Potassium			Silicon			Sodium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
DZ-8 re-sample 2[a]	J1HH85	4/13/11	14500		3.5	14.3	X	0.25	3940		3.4	221		0.091	0.019		0.0050	9.9	X	0.11	843		37.5	192		5.2	244		53.9
Duplicate of J1HH85[a]	J1HH86	4/13/11	15100		3.7	17.3	X	0.26	4280		3.6	228		0.097	0.020		0.0050	11.3	X	0.12	891		39.9	219		5.5	236		57.4

Analysis:

TDL		5	5	75	5	0.2	4	400	2	50
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)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	4.1%		8.3%	3.1%				13.1%	
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Vanadium			Zinc			Bis(2-ethylhexyl)phthalate			Fluoride			Nitrogen in nitrate [e]			Nitrogen in nitrate and nitrite			Phosporous in phosphate			Sulfate			TPH - motor oil (high boiling)		
			mg/kg	Q	PQL	mg/kg	Q	PQL	ug/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
DZ-8 re-sample 2[a]	J1HH85	4/13/11	35.9		0.086	60.8		0.36	69	JB	47																		
Duplicate of J1HH85[a]	J1HH86	4/13/11	37.1		0.091	77.2		0.39	83	JB	47																		
DZ-1	J19YD1	5/18/10										0.9	B	2.3	2.78	J	0.52	1.7		0.21	2.5	J	2.3	7.8		2.3	5670	J	10200
Duplicate of J19YD1	J19YF3	5/18/10										1.2	B	2.4	2.64		0.54	1.62		0.22	3.2		2.4	8.4		2.4	3480	J	10400

Analysis:

TDL		2.5	1	660	5	0.75	0.75	5	5	5000
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	
	RPD	3.3%	23.8%							
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie **Date** 05/17/11 **Calc. No.** 0100H-CA-V0164 **Rev. No.** 0

Project 100-H Field Remediation **Job No.** 14655 **Checked** T. E. Queen **Date** 05/17/11

Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 46 of 47

Duplicate Analysis - 116-H-5 Waste Site Overburden

Sampling Area	Sample Number	Sample Date	Potassium-40			Radium-226			Radium-228			Thorium-228 GEA			Thorium-232 GEA			Uranium-233/234			Uranium-238			Aluminum			Antimony		
			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	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	12.9		0.766	0.410		0.170	0.619		0.346	0.706		0.118	0.619		0.346	0.517		0.172	0.427		0.172	6390		16.3	0.344	B	0.813
Duplicate of J19YF8	J19YH6	5/13/10	14.6		1.16	0.488		0.175	1.00		0.326	0.944		0.135	1.00		0.326	0.579		0.201	0.526		0.201	6090		19.0	0.388	B	0.951

Analysis:

	TDL	0.5	0.1	0.2	1	1	1	1	5	0.6
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	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)	
	RPD	12.4%							4.8%	
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Arsenic			Barium			Beryllium			Boron			Calcium			Chromium			Cobalt			Copper			Iron		
			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
OB-5	J19YF8	5/13/10	4.95		0.813	51.4		0.407	0.162	B	0.163	0.938	B	1.63	4560		16.3	10.4		0.813	5.41		2.44	12.7		1.63	16200		16.3
Duplicate of J19YF8	J19YH6	5/13/10	4.74		0.951	47.2		0.478	0.149	B	0.190	0.842	B	1.90	4040		19.0	10.1		0.951	5.16		2.85	12.7		1.90	15800		19.0

Analysis:

	TDL	10	2	0.2	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?	No-Stop (acceptable)	Yes (calc RPD)			Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD		8.5%			12.1%	2.9%		0.0%	2.5%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Lead			Magnesium			Manganese			Nickel			Potassium			Silicon			Sodium			Vanadium			Zinc		
			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
OB-5	J19YF8	5/13/10	13.1		0.813	4170		4.07	250		0.813	11.1		2.03	819		81.3	172		4.88	190		40.7	42.5		0.813	32.2		2.44
Duplicate of J19YF8	J19YH6	5/13/10	13.0		0.951	4130		4.76	239		0.951	10.6		2.38	742		95.1	196		5.71	190		47.6	39.5		0.951	31.2		2.85

Analysis:

	TDL	5	75	5	4	400	2	50	2.5	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)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD		1.0%	4.5%			13.0%		7.3%	3.2%
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Benzo(a)anthracene (Method 8310)			Benzo(a)pyrene (Method 8310)			Benzo(b)fluoranthene (Method 8310)			Benzo(ghi)perylene (Method 8310)			Benzo(k)fluoranthene (Method 8310)			Chrysene (Method 8310)			Fluoranthene (Method 8310)			Indeno(1,2,3-cd)pyrene (Method 8310)			Phenanthrene (Method 8310)		
			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	ug/kg	Q	PQL	ug/kg	Q	PQL
OB-5	J19YF8	5/13/10	5.88		3.25	7.38		3.25	8.77		3.25	4.89		3.25	3.72		3.25	3.77		3.25	21		3.25	5.72		3.25	6.78		3.25
Duplicate of J19YF8	J19YH6	5/13/10	4.07		3.25	4.25		3.25	7.52		3.25	3.03	J	3.25	2.31	J	3.25	1.17	J	3.25	9.18		3.25	4.02		3.25	3.08	J	3.25

Analysis:

	TDL	15	15	15	15	15	15	15	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	No-Stop (acceptable)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)				No-Stop (acceptable)	No-Stop (acceptable)	
	RPD									
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Pyrene (Method 8310)			Fluoride			Nitrogen in nitrate *			Nitrogen in nitrate and nitrite			Sulfate		
			ug/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	17.2		3.25	0.8	B	2.5	0.70		0.56	0.66		0.20	5.6		2.5
Duplicate of	J19YH6	5/13/10	7.13		3.25	0.5	B	2.5	0.81		0.56	0.75		0.20	6.2		2.5

Analysis:

	TDL	15	5	0.75	0.75	5
Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)		No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD					
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie | Date 05/17/11 | Calc. No. 0100H-CA-V0164 | Rev. No. 0
Project 100-H Field Remediation | Job No. 14655 | Checked T. E. Queen | Date 05/17/11
Subject 116-H-5 Waste Site Cleanup Verification 95% UCL Calculations | Sheet No. 47 of 47

Duplicate Analysis - 116-H-5 Waste Site Staging Pile Area

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 GEA pCi/g	Q	MDA	Thorium-232 GEA pCi/g	Q	MDA
SPA-8	J19YJ4	5/17/10	12.3		0.628	0.506		0.140	0.500		0.255	0.573		0.079	0.500		0.255
Duplicate of J19YJ4	J19YJ9	5/17/10	15.7		0.301	0.567		0.057	0.829		0.137	0.831		0.036	0.829		0.137

Analysis:

TDL		0.5	0.1	0.2	1	1
Duplicate Analysis	Both > PQL?	Yes (continue)		Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	24.3%	11.4%			
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Aluminum mg/kg	Q	PQL	Arsenic mg/kg	Q	PQL	Barium mg/kg	Q	PQL	Beryllium 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	Lead mg/kg	Q	PQL
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	5420	X	1.4	1.7		0.58	32.9	X	0.067	0.085	B	0.029	0.054	B	0.036	5790	X	12.4	8.8	X	0.051	4.9	X	0.088	12.3		0.19	12900	X	3.3	2.7	X	0.24
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	5260	X	1.6	2.1		0.69	36.4	X	0.079	0.074	B	0.034	0.079	B	0.043	5660	X	14.7	9.6	X	0.060	5.1	X	0.10	11.4		0.23	13100	X	4.0	2.4	X	0.28

Analysis:

TDL		5	10	2	0.2	0.2	100	1	2	1	5	5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	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)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	3.0%		10.1%			2.3%	8.7%		7.6%	1.5%	
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Magnesium mg/kg	Q	PQL	Manganese 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	Zinc mg/kg	Q	PQL	Anthracene (Method 8310) ug/kg	Q	PQL	Benzo(a)anthracene (Method 8310) ug/kg	Q	PQL	Benzo(a)pyrene (Method 8310) ug/kg	Q	PQL
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	3760	X	3.3	222	X	0.088	8.3	X	0.11	601		36.1	164	N	5.0	185		52.0	35.8		0.083	28.4	X	0.35	87		3.0	230		3.1	170		6.2
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	4040	X	3.8	225	X	0.10	10.3	X	0.13	689		42.6	195	N	5.9	203		61.4	38.0		0.098	28.1	X	0.41	48		2.9	170		3.1	120		6.2

Analysis:

TDL		75	5	4	400	2	50	2.5	1	15	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	7.2%	1.3%			17.3%		6.0%	1.1%		30.0%	34.5%
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	Yes - assess further	Not applicable	Not applicable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Benzo(b)fluoranthene (Method 8310) ug/kg	Q	PQL	Benzo(ghi)perylene (Method 8310) ug/kg	Q	PQL	Benzo(k)fluoranthene (Method 8310) ug/kg	Q	PQL	Chrysene (Method 8310) ug/kg	Q	PQL	Dibenz[a,h]anthracene (Method 8310) ug/kg	Q	PQL	Fluoranthene (Method 8310) ug/kg	Q	PQL	Fluorene (Method 8310) ug/kg	Q	PQL	Indeno(1,2,3-cd)pyrene (Method 8310) ug/kg	Q	PQL	Phenanthrene (Method 8310) ug/kg	Q	PQL	Pyrene (Method 8310) ug/kg	Q	PQL	Benzo(a)anthracene (Method 8270) ug/kg	Q	PQL
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	190		4.1	96		7.0	87		3.8	160		4.7	26	JX	11	400		13	57		5.1	120		12	240		12	400		12	71	J	20
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	140		4.0	38	X	6.9	69		3.8	140		4.6	19	JX	11	290		12	31		5.1	110		12	130		12	300		12	130	J	20

Analysis:

TDL		15	15	15	15	15	15	15	15	15	15	660
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	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)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	30.3%			13.3%		31.9%		8.7%	59.5%	28.6%	
	Difference > 2 TDL?	Not applicable	Yes - assess further	No - acceptable	Not applicable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	Benzo(a)pyrene (Method 8270) ug/kg	Q	PQL	Benzo(b)fluoranthene (Method 8270) ug/kg	Q	PQL	Benzo(ghi)perylene (Method 8270) ug/kg	Q	PQL	Bis (2-ethylhexyl)phthalate ug/kg	Q	PQL	Chrysene (Method 8270) ug/kg	Q	PQL	Fluoranthene (Method 8270) ug/kg	Q	PQL	Indeno(1,2,3-cd)pyrene (Method 8270) ug/kg	Q	PQL	Phenanthrene (Method 8270) ug/kg	Q	PQL	Pyrene (Method 8270) ug/kg	Q	PQL	Nitrogen in nitrate * mg/kg	Q	PQL	Sulfate mg/kg	Q	PQL	TPH-diesel range ug/kg	Q	PQL
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	110	J	20	120	JX	26	41	J	16	110	JB	46	66	J	27	120	J	36	83	J	22	44	J	17	110	J	12	0.43	B	0.31	1.7	B	1.7	6900		690
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	150	J	20	210	JX	26	68	J	16	110	JB	46	120	J	27	210	J	36	110	J	22	62	J	17	190	J	12	0.41	B	0.32	1.9	B	1.8	2200	J	690

Analysis:

TDL		660	660	660	660	660	660	660	660	660	0.75	5	5000
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)		No-Stop (acceptable)
	RPD												
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Duplicate Analysis - 116-H-5 Waste Site

Sampling Area	HEIS Number	Sample Date	TPH-motor oil (high boiling) ug/kg	Q	PQL	TPH diesel range EXT ug/kg	Q	PQL
SPA-8	J19YJ4	5/17/10	40800		10100			
Duplicate of J19YJ4	J19YJ9	5/17/10	64900		10100			
SPA-4 re-sample 1[a]	J1FKM0	3/17/11				15000		1000
Duplicate of J1FKM0[a]	J1FKM9	3/17/11				5700		1000

Analysis:

TDL		5000	5000
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)
	RPD	45.6%	
	Difference > 2 TDL?	Not applicable	No - acceptable

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	8400		18.1	0.907	UJ	0.907	4.27		0.907	67.8		0.453	0.263		0.181
Duplicate of J19YB9	J19YD0	5/18/10	7600		13.9	0.695	U	0.695	3.99		0.695	60.1		0.348	0.232		0.139
SZ-1	J19YB8	5/18/10	5270		14.8	0.742	UJ	0.742	2.13		0.742	33.6		0.371	0.130	B	0.148
SZ-3	J19YC0	5/18/10	7400		16.0	0.801	UJ	0.801	2.83		0.801	69.8		0.401	0.208		0.160
SZ-4	J19YC1	5/18/10	6340		18.0	0.902	UJ	0.902	5.32		0.902	51.9		0.451	0.172	B	0.180
SZ-5	J19YC2	5/18/10	6480		15.3	0.767	UJ	0.767	6.45		0.767	46.7		0.383	0.192		0.153
SZ-6	J19YC3	5/18/10	7240		16.7	0.837	UJ	0.837	3.75		0.837	63.4		0.418	0.216		0.167
SZ-7	J19YC4	5/18/10	7110		19.4	0.378	UJ	0.378	6.58		0.378	52.0		0.486	0.193	B	0.194
SZ-8	J19YC5	5/18/10	7120		15.1	0.28	UJ	0.753	4.84		0.753	62.2		0.377	0.206		0.151
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	6940		1.5	0.36	U	0.36	4.8		0.63	69.6		0.073	0.11	BM	0.032
SZ-10	J19YC7	5/18/10	6700		13.6	0.678	UJ	0.678	7.65		0.678	54.8		33.9	0.181		0.136
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	3790		1.4	0.33	U	0.33	1.1		0.58	43.0		0.066	0.029	U	0.029
SZ-12	J19YC9	5/18/10	6190		17.2	0.859	U	0.859	3.06		0.859	50.7		0.430	0.155	B	0.172
DZ-8 re-sample 2[a]	J1HH85	4/13/11	6430		1.4	0.35	U	0.35	6.0		0.60	43.4		0.069	0.12	B	0.030
Duplicate of J1HH85[a]	J1HH86	4/13/11	6810		1.5	0.37	U	0.37	6.7		0.64	42.1		0.074	0.13	B	0.032
DZ-1 re-sample 2[a]	J1HH80	4/13/11	6390		1.5	0.37	U	0.37	7.0		0.65	60.9		0.074	0.13	B	0.032
DZ-2 re-sample 2[a]	J1HH81	4/13/11	5580		1.4	0.35	U	0.35	2.5		0.61	57.7		0.070	0.063	B	0.031
DZ-3 re-sample 2[a]	J1HH82	4/13/11	6100		1.5	0.37	U	0.37	1.9		0.64	59.7		0.074	0.042	B	0.032
DZ-4 re-sample 2[a]	J1HH83	4/13/11	7380		1.5	0.36	U	0.36	4.8		0.63	68.3		0.073	0.16	B	0.032
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	5290		1.5	0.36	U	0.36	9.8		0.63	35.5		0.072	0.031	U	0.031
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	6310		1.4	0.34	U	0.34	1.8		0.59	50.3		0.068	0.030	U	0.030
DZ-7 re-sample 2[a]	J1HH84	4/13/11	5230		1.6	0.39	U	0.39	4.2		0.69	34.7		0.079	0.098	B	0.034
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	5210		1.5	0.36	U	0.36	1.1		0.62	77.1		0.072	0.031	U	0.031
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	5910		1.5	0.38	U	0.38	2.4		0.65	57.4		0.075	0.033	U	0.033
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	8980		1.6	0.39	U	0.39	2.8		0.67	69.0		0.077	0.074	B	0.034
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	6950		1.6	0.39	U	0.39	3.2		0.68	90.3		0.078	0.034	U	0.034

Footnotes apply to all calculations sheets and attachment 1.

[a] Location re-sampled due to RAG exceedance. All replaced data is shown in attachment 1 and is for information only. Re-sample strategy is further explained in the RSVP.

[b] Nitrate, nitrite, and phosphate were converted to nitrogen in nitrate, nitrogen in nitrite, and phosphorus in phosphate respectively.

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

B = blank contamination (inorganic constituents)
C = </= 5x blank concentration
D = dilution
HEIS = Hanford Environmental Information System
J = estimate
M = duplicate precision not met.
N = recovery outside control limits

PQL = practical quantitation limit
Q = qualifier
R = rejected
U = undetected
X = >40% difference between primary and confirmation detector results.

Attachment	1	Sheet No.	1 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	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
SZ-2	J19YB9	5/18/10	1.22	B	1.81	0.227	U	0.227	4240		18.1	21.2		0.907	6.33		2.72
Duplicate of J19YB9	J19YD0	5/18/10	1.11	B	1.39	0.073	B	0.174	4040		13.9	15.9		0.695	5.42		2.09
SZ-1	J19YB8	5/18/10	0.759	B	1.48	0.041	B	0.186	6370		14.8	8.93		0.742	4.91		2.23
SZ-3	J19YC0	5/18/10	3.44		1.60	0.086	B	0.200	4940		16.0	12.7		0.801	5.79		2.40
SZ-4	J19YC1	5/18/10	1.26	B	1.80	0.065	B	0.225	5770		18.0	10.4		0.902	6.11		2.71
SZ-5	J19YC2	5/18/10	1.12	B	1.53	0.060	B	0.192	5310		15.3	11.0		0.767	5.45		2.30
SZ-6	J19YC3	5/18/10	1.26	B	1.67	0.059	B	0.209	5040		16.7	12.8		0.837	6.41		2.51
SZ-7	J19YC4	5/18/10	1.18	B	1.94	0.052	B	0.243	5590		19.4	11.7		0.971	5.82		2.91
SZ-8	J19YC5	5/18/10	1.34	B	1.51	0.101	B	0.188	4280		15.1	12.6		0.753	5.65		2.26
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	1.0	B	0.94	0.074	BM	0.039	5790		13.5	9.9	X	0.055	6.6	X	0.095
SZ-10	J19YC7	5/18/10	0.967	B	1.36	0.059	B	0.170	5340		13.6	10.2		0.678	5.6		2.04
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.86	U	0.86	0.070	B	0.036	4550		12.3	5.3	X	0.051	7.6	X	0.087
SZ-12	J19YC9	5/18/10	1.0	B	1.72	0.105	B	0.215	6020		17.2	13.1		0.859	5.38		2.58
DZ-8 re-sample 2[a]	J1HH85	4/13/11	0.90	U	0.90	0.14	B	0.037	5170		12.9	12.8		0.053	5.3	X	0.091
Duplicate of J1HH85[a]	J1HH86	4/13/11	0.95	U	0.95	0.19		0.040	4840		13.7	15.1		0.056	5.4	X	0.097
DZ-1 re-sample 2[a]	J1HH80	4/13/11	1.2	B	0.96	0.067	B	0.040	7110		13.8	9.8		0.057	6.2	X	0.098
DZ-2 re-sample 2[a]	J1HH81	4/13/11	0.91	U	0.91	0.046	B	0.038	3970		13.0	6.2		0.054	6.4	X	0.093
DZ-3 re-sample 2[a]	J1HH82	4/13/11	0.96	U	0.96	0.042	B	0.040	4730		13.8	15.1		0.057	6.6	X	0.098
DZ-4 re-sample 2[a]	J1HH83	4/13/11	0.94	U	0.94	0.081	B	0.039	5650		13.5	12.9		0.056	6.3	X	0.096
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	0.93	U	0.93	0.039	U	0.039	4840		13.4	7.6		0.055	5.1	X	0.095
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	0.88	U	0.88	0.052	B	0.037	4910		12.6	7.2		0.052	5.5	X	0.090
DZ-7 re-sample 2[a]	J1HH84	4/13/11	1.0	U	1.0	0.055	B	0.043	3580		14.6	8.8		0.060	4.7	X	0.10
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	0.93	U	0.93	0.039	U	0.039	3500		13.3	6.5		0.055	5.5	X	0.095
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	0.97	U	0.97	0.041	U	0.041	3860		14.0	8.7		0.057	5.7	X	0.099
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	1.0	U	1.0	0.042	U	0.042	5890		14.4	11.6		0.059	6.4	X	0.10
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	1.0	U	1.0	0.064	B	0.042	3920		14.5	8.3		0.060	6.7	X	0.10

Attachment	1	Sheet No.	2 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Copper			Hexavalent Chromium			Iron			Lead			Magnesium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	12.5		1.81	0.23	U	0.23	21700		18.1	4.66		0.907	4670		4.53
Duplicate of J19YB9	J19YD0	5/18/10	11.4		1.39	0.21	U	0.21	18700		13.9	5.41		0.695	4110		3.48
SZ-1	J19YB8	5/18/10	12.2		1.48	0.06	B	0.21	14800		14.8	3.44		0.742	3840		3.71
SZ-3	J19YC0	5/18/10	13.1		1.60	0.20	U	0.20	18100		16.0	8.37		0.801	4500		4.01
SZ-4	J19YC1	5/18/10	16.1		1.80	0.21	U	0.21	17500		18.0	15.2		0.902	4070		4.51
SZ-5	J19YC2	5/18/10	13.0		1.53	0.21	U	0.21	17400		15.3	15.9		0.767	4190		3.83
SZ-6	J19YC3	5/18/10	12.8		1.67	0.21	U	0.21	20200		16.7	6.41		0.837	4140		4.18
SZ-7	J19YC4	5/18/10	13.3		1.94	0.21	U	0.21	17900		19.4	17.3		0.971	4300		4.86
SZ-8	J19YC5	5/18/10	12.0		1.51	0.21	U	0.21	18000		15.1	15.1		0.753	4010		3.77
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	17.3		0.21	0.145	U	0.145	15400	X	3.6	8.0		0.26	4420	X	3.5
SZ-10	J19YC7	5/18/10	14.3		1.36	0.21	U	0.21	17100		13.6	24.2		0.678	4050		3.39
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	14.5		0.19	0.146	U	0.146	18000	X	3.3	2.3		0.24	3720	X	3.2
SZ-12	J19YC9	5/18/10	12.5		1.72	0.21	U	0.21	16500		17.2	5.8		0.859	4650		4.30
DZ-8 re-sample 2[a]	J1HH85	4/13/11	18.5		0.20				14500		3.5	14.3	X	0.25	3940		3.4
DZ-8	J19YD8	5/18/10	11.9		1.93	0.21	U	0.21	15500		19.3	7.78		0.97	3270		4.83
Duplicate of J1HH85[a]	J1HH86	4/13/11	16.2		0.21				15100		3.7	17.3	X	0.26	4280		3.6
Duplicate of J19YD1	J19YF3	5/18/10	12.7		1.86	0.21	U	0.21	16200		18.6	14.3		0.93	3950		4.65
DZ-1 re-sample 2[a]	J1HH80	4/13/11	14.0		0.21				16600		3.7	18.5	X	0.26	4030		3.6
DZ-1	J19YD1	5/18/10	12.8		1.47	0.21	U	0.21	15500		14.7	12.5		0.74	3430		3.68
DZ-2 re-sample 2[a]	J1HH81	4/13/11	15.3		0.20				18500		3.5	4.2	X	0.25	3430		3.4
DZ-2	J19YD2	5/18/10	13.6		2.07	0.21	U	0.21	20400		20.7	7.09		1.03	4290		5.17
DZ-3 re-sample 2[a]	J1HH82	4/13/11	13.4		0.21				18200		3.7	2.9	X	0.26	4190		3.6
DZ-3	J19YD3	5/18/10	12.8		2.10	0.21	U	0.21	18600		21.0	7.83		1.05	4410		5.24
DZ-4 re-sample 2[a]	J1HH83	4/13/11	14.4		0.21				16800		3.6	11.4	X	0.26	4410		3.6
DZ-4	J19YD4	5/18/10	13.4		1.39	0.21	U	0.21	17500		13.9	13.1		0.70	4250		3.48
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	12.8		0.21				12800	X	3.6	31.3		0.26	3480		3.5
DZ-5	J19YD5	5/18/10	13.5		1.58	0.21	U	0.21	17800		15.8	58.2		0.79	4230		3.94
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	15.4		0.19				13900	X	3.4	8.4		0.24	3340		3.3
DZ-6	J19YD6	5/18/10	13.8		1.43	0.21	U	0.21	16500		14.3	15.5		0.71	4120		3.56
DZ-7 re-sample 2[a]	J1HH84	4/13/11	11.7		0.23				12500		3.9	11.3	X	0.28	3520		3.8
DZ-7	J19YD7	5/18/10	14.9		1.59	0.21	U	0.21	18300		15.9	22.8		0.79	4270		3.97
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	12.7		0.21				15300	X	3.6	3.5		0.26	3050		3.5
DZ-9	J19YD9	5/18/10	13.4		1.74	0.21	U	0.21	17800		17.4	14.4		0.87	4120		4.35
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	13.6		0.21				14800	X	3.8	6.0		0.27	3820		3.7
DZ-10	J19YF0	5/18/10	14.1		1.50	0.21	U	0.21	17000		15.0	12.7		0.75	3130		3.74
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	15.9		0.22				16000	X	3.9	8.4		0.27	4590		3.8
DZ-11	J19YF1	5/18/10	14.9		1.68	0.21	U	0.21	17400		16.8	15.8		0.84	3970		4.21
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	15.8		0.22				18800	X	3.9	9.8		0.28	3900		3.8
DZ-12	J19YF2	5/18/10	13.6		1.56	0.21	U	0.21	17000		15.6	14.7		0.78	4250		3.90

Attachment	1	Sheet No.	3 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Manganese			Mercury			Molybdenum			Nickel			Potassium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	278		0.907	0.015	B	0.03	0.294	B	0.907	15.6		2.27	1200		90.7
Duplicate of J19YB9	J19YD0	5/18/10	256		0.695	0.027	U	0.027	0.243	B	0.695	12.2		1.74	1100		69.5
SZ-1	J19YB8	5/18/10	227		0.742	0.026	U	0.026	0.252	B	0.742	8.94		1.86	668		74.2
SZ-3	J19YC0	5/18/10	268		0.801	0.019	B	0.03	0.271	B	0.801	10.9		2.00	1600		80.1
SZ-4	J19YC1	5/18/10	257		0.902	0.026	U	0.026	0.276	B	0.902	9.84		2.25	921		90.2
SZ-5	J19YC2	5/18/10	263		0.767	0.024	U	0.24	0.233	B	0.767	10		1.92	868		76.7
SZ-6	J19YC3	5/18/10	274		0.837	0.018	B	0.03	0.321	B	0.837	10.8		2.09	1130		83.7
SZ-7	J19YC4	5/18/10	272		0.971	0.03	U	0.03	0.26	B	0.971	10		2.43	986		97.1
SZ-8	J19YC5	5/18/10	270		0.753	0.027	U	0.027	0.252	B	0.753	10.2		1.88	1210		75.3
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	284	X	0.095	0.0054	U	0.0054	0.25	U	0.25	11.1	X	0.12	853		39.1
SZ-10	J19YC7	5/18/10	266		0.678	0.011	B	0.02	0.25	B	0.678	9.63		1.70	884		67.8
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	234	X	0.087	0.0050	U	0.0050	0.23	U	0.23	11.5	X	0.11	425		35.8
SZ-12	J19YC9	5/18/10	251		0.859	0.027	U	0.027	0.298	B	0.859	12.5		2.15	642		85.9
DZ-8 re-sample 2[a]	J1HH85	4/13/11	221		0.091	0.019		0.0050	0.24	U	0.24	9.9	X	0.11	843		37.5
Duplicate of J1HH85[a]	J1HH86	4/13/11	228		0.097	0.020		0.0050	0.25	U	0.25	11.3	X	0.12	891		39.9
DZ-1 re-sample 2[a]	J1HH80	4/13/11	283		0.098	0.0055	U	0.0055	0.25	U	0.25	10.6	X	0.12	897		40.1
DZ-2 re-sample 2[a]	J1HH81	4/13/11	252		0.093	0.0051	U	0.0051	0.24	U	0.24	8.1	X	0.11	516		37.9
DZ-3 re-sample 2[a]	J1HH82	4/13/11	231		0.098	0.0053	U	0.0053	0.25	U	0.25	12.8	X	0.12	545		40.1
DZ-4 re-sample 2[a]	J1HH83	4/13/11	261		0.096	0.0057	U	0.0057	0.87	B	0.25	11.5	X	0.12	1050		39.4
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	209		0.095	0.0056	U	0.0056	0.25	U	0.25	10.1	X	0.12	711		39.0
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	217		0.090	0.0057	U	0.0057	0.23	U	0.23	9.2	X	0.11	573		36.7
DZ-7 re-sample 2[a]	J1HH84	4/13/11	206		0.10	0.0063	U	0.0063	0.27	U	0.27	12.2	X	0.13	634		42.6
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	219		0.095	0.0055	U	0.0055	0.25	U	0.25	6.8	X	0.12	542		38.8
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	230		0.099	0.0054	U	0.0054	0.26	U	0.26	9.2	X	0.12	577		40.6
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	260		0.10	0.0060	U	0.0060	0.26	U	0.26	13.5	X	0.13	1300		41.7
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	284		0.10	0.0052	U	0.0052	0.27	U	0.27	11.3	X	0.13	782		42.3

Attachment	1	Sheet No.	4 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Selenium			Silicon			Silver			Sodium			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	0.272	U	0.27	571		5.44	0.907	U	0.91	165		45.3	52.6		0.91
Duplicate of J19YB9	J19YD0	5/18/10	0.209	U	0.21	512		4.17	0.695	U	0.7	147		34.8	43.7		0.7
SZ-1	J19YB8	5/18/10	0.223	U	0.22	415		4.45	0.742	U	0.74	181		37.1	42.9		0.74
SZ-3	J19YC0	5/18/10	0.24	U	0.24	521		4.81	0.801	U	0.8	210		40.1	47		0.8
SZ-4	J19YC1	5/18/10	0.271	U	0.27	658		5.41	0.902	U	0.9	181		45.1	46.8		0.9
SZ-5	J19YC2	5/18/10	0.23	U	0.23	974		4.6	0.767	U	0.77	192		38.3	46.1		0.77
SZ-6	J19YC3	5/18/10	0.251	U	0.25	1000		5.02	0.837	U	0.84	214		41.8	52.8		0.84
SZ-7	J19YC4	5/18/10	0.291	U	0.29	1150		5.83	0.971	U	0.97	200		48.6	49.4		0.97
SZ-8	J19YC5	5/18/10	0.226	U	0.23	473		4.52	0.753	U	0.75	193		37.7	45.2		0.75
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.82	U	0.82	188		5.4	0.15	U	0.15	184		56.3	42.6		0.090
SZ-10	J19YC7	5/18/10	0.204	U	0.2	399		4.07	0.678	U	0.68	212		33.9	45.4		0.68
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.75	U	0.75	117		4.9	0.14	U	0.14	246		51.6	47.4		0.082
SZ-12	J19YC9	5/18/10	0.258	U	0.26	493		5.15	0.859	U	0.86	177		43	46.6		0.86
DZ-8 re-sample 2[a]	J1HH85	4/13/11	0.79	U	0.79	192		5.2	0.15	U	0.15	244		53.9	35.9		0.086
Duplicate of J1HH85[a]	J1HH86	4/13/11	0.84	U	0.84	219		5.5	0.16	U	0.16	236		57.4	37.1		0.091
DZ-1 re-sample 2[a]	J1HH80	4/13/11	0.84	U	0.84	241	N	5.5	0.16	U	0.16	236		57.7	40.3		0.092
DZ-2 re-sample 2[a]	J1HH81	4/13/11	0.80	U	0.80	131		5.2	0.15	U	0.15	323		54.6	48.7		0.087
DZ-3 re-sample 2[a]	J1HH82	4/13/11	0.84	U	0.84	126		5.5	0.16	U	0.16	320		57.6	56.4		0.092
DZ-4 re-sample 2[a]	J1HH83	4/13/11	0.83	U	0.83	352		5.4	0.15	U	0.15	257		56.6	41.9		0.090
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	0.82	U	0.82	174		5.4	0.15	U	0.15	215		56.1	33.6		0.089
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	0.77	U	0.77	174		5.1	0.14	U	0.14	388		52.9	39.4		0.084
DZ-7 re-sample 2[a]	J1HH84	4/13/11	0.89	U	0.89	245		5.9	0.17	U	0.17	163		61.3	30.5		0.098
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	0.81	U	0.81	112		5.4	0.15	U	0.15	285		55.8	47.9		0.089
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	0.85	U	0.85	169		5.6	0.16	U	0.16	281		58.4	35.4		0.093
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	0.88	U	0.88	200		5.8	0.16	U	0.16	300		60.0	40.9		0.096
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	0.89	U	0.89	209		5.8	0.17	U	0.17	270		60.9	54.7		0.097

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Zinc		
			mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	37.8		2.72
Duplicate of J19YB9	J19YD0	5/18/10	33.9		2.09
SZ-1	J19YB8	5/18/10	29		2.23
SZ-3	J19YC0	5/18/10	68.7		2.4
SZ-4	J19YC1	5/18/10	38		2.71
SZ-5	J19YC2	5/18/10	33.4		2.3
SZ-6	J19YC3	5/18/10	39.2		2.51
SZ-7	J19YC4	5/18/10	35.8		2.91
SZ-8	J19YC5	5/18/10	69.8		2.26
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	35.2	X	0.38
SZ-10	J19YC7	5/18/10	34.8		2.04
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	34.3	X	0.35
SZ-12	J19YC9	5/18/10	35.5		2.58
DZ-8 re-sample 2[a]	J1HH85	4/13/11	60.8		0.36
Duplicate of J1HH85[a]	J1HH86	4/13/11	77.2		0.39
DZ-1 re-sample 2[a]	J1HH80	4/13/11	39.0		0.39
DZ-2 re-sample 2[a]	J1HH81	4/13/11	35.5		0.37
DZ-3 re-sample 2[a]	J1HH82	4/13/11	34.4		0.39
DZ-4 re-sample 2[a]	J1HH83	4/13/11	38.9		0.38
DZ-5 re-sample 1[a]	J1FKK5	3/16/11	27.4	X	0.38
DZ-6 re-sample 1[a]	J1FKK6	3/16/11	31.6	X	0.36
DZ-7 re-sample 2[a]	J1HH84	4/13/11	29.6		0.41
DZ-9 re-sample 1[a]	J1FKK9	3/16/11	30.9	X	0.38
DZ-10 re-sample 1[a]	J1FKL0	3/16/11	31.3	X	0.39
DZ-11 re-sample 1[a]	J1FKL1	3/16/11	44.7	X	0.41
DZ-12 re-sample 1[a]	J1FKL2	3/16/11	46.2	X	0.41

Attachment	1	Sheet No.	6 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	6390		16.3	0.344	B	0.813	4.95		0.813	51.4		0.407	0.162	B	0.163
Duplicate of J19YF8	J19YH6	5/13/10	6090		19.0	0.388	B	0.951	4.74		0.951	47.2		0.478	0.149	B	0.190
OB-1	J19YF4	5/13/10	6570		14.4	0.377	B	0.722	3.27		0.722	50.9		0.361	0.153		0.144
OB-2	J19YF5	5/13/10	6610		18.2	0.437	B	0.912	4.17		0.912	51.8		0.456	0.161	B	0.182
OB-3	J19YF6	5/13/10	6150		17.1	0.464	B	0.854	6.21		0.854	47.8		0.427	0.169	B	0.171
OB-4	J19YF7	5/13/10	6270		16.8	0.272	B	0.840	3.96		0.840	48.5		0.420	0.162	B	0.168
OB-6	J19YF9	5/13/10	6990		17.4	0.426	B	0.869	8.14		0.869	54.4		0.434	0.197		0.174
OB-7	J19YH0	5/13/10	5560		17.1	0.279	B	0.855	5.13		0.855	43.1		0.427	0.149	B	0.171
OB-8 re-sample 1[a]	J1FKL6	3/17/11	6320	X	1.5	0.37	U	0.37	6.5		0.63	49.8	X	0.073	0.12	B	0.032
OB-9	J19YH2	5/13/10	5590		15.5	0.773	U	0.773	3.59		0.773	48.7		0.386	0.136	B	0.155
OB-10	J19YH3	5/13/10	5600		18.7	0.309	B	0.933	4.77		0.933	37.8		0.466	0.14	B	0.187
OB-11	J19YH4	5/13/10	7240		17.1	0.491	B	0.854	6.82		0.854	67.6		0.427	0.208		0.171
OB-12	J19YH5	5/13/10	6330		15.5	0.469	B	0.776	5.29		0.776	46.4		0.388	0.175		0.155
OB-13	J1B4H9	5/17/10	6330		13.0	0.254	B	0.652	4.23		0.652	57.1		0.326	0.181		0.130
OB-14	J1B4J0	5/17/10	5690		15.4	0.772	U	0.772	4.75		0.772	46.2		0.386	0.147	B	0.154
OB-15	J1B4J1	5/17/10	6580		17.6	0.274	B	0.881	6.1		0.881	57.4		0.441	0.181		0.176
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	5420	X	1.4	0.33	U	0.33	1.7		0.58	32.9	X	0.067	0.085	B	0.029
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	5260	X	1.6	0.40	U	0.40	2.1		0.69	36.4	X	0.079	0.074	B	0.034
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	5400	X	1.4	0.34	U	0.34	2.2		0.59	36.4	X	0.067	0.089	B	0.029
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	5490	X	1.5	0.37	U	0.37	1.7		0.64	33.5	X	0.074	0.079	B	0.032
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	4220	X	1.3	0.33	U	0.33	1.5		0.57	37.3	X	0.066	0.069	B	0.029
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	6890	X	1.4	0.34	U	0.34	7.8		0.58	88.8	X	0.067	0.15	B	0.029
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	6790	X	1.4	0.34	U	0.34	9.1		0.59	60.5	X	0.068	0.15	B	0.030
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	8050	X	1.6	0.40	U	0.40	14.1		0.69	126	X	0.079	0.17	B	0.034
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	7710	X	1.6	0.40	U	0.40	6.7		0.70	68.3	X	0.080	0.10	B	0.035
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	9590	X	1.6	0.38	U	0.38	12.2		0.67	82.9	X	0.077	0.22		0.033
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	6210	X	1.5	0.37	U	0.37	3.4		0.65	40.6	X	0.075	0.047	B	0.032
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	4580	X	1.3	0.33	U	0.33	2.2		0.56	43.0	X	0.065	0.028	B	0.028
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	7770	X	1.4	0.34	U	0.34	14.2		0.59	72.5	X	0.068	0.16	B	0.030
Equipment Blank	J19YK0	5/17/10	153		14.9	0.743	U	0.74	0.254	B	0.74	1.76		0.37	0.149	U	0.15
Equipment Blank	J1FKN0	3/17/11	239	X	1.3	0.33	U	0.33	0.57	U	0.57	10.3	X	0.066	0.091	B	0.028
Equipment Blank	J1HH87	4/13/11	238		1.3	0.33	U	0.33	0.57	U	0.57	2.8		0.066	0.041	B	0.029

Attachment	1	Sheet No.	7 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	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
OB-5	J19YF8	5/13/10	0.938	B	1.63	0.203	U	0.203	4560		16.3	10.4		0.813	5.41		2.44
Duplicate of J19YF8	J19YH6	5/13/10	0.842	B	1.90	0.238	U	0.238	4040		19.0	10.1		0.951	5.16		2.85
OB-1	J19YF4	5/13/10	0.853	B	1.44	0.180	U	0.180	4160		14.4	13.2		0.722	5.37		2.17
OB-2	J19YF5	5/13/10	0.958	B	1.82	0.054	B	0.228	4630		18.2	11.4		0.912	5.34		2.74
OB-3	J19YF6	5/13/10	0.916	B	1.71	0.213	U	0.213	5800		17.1	10.7		0.854	5.52		2.56
OB-4	J19YF7	5/13/10	0.902	B	1.68	0.210	U	0.210	4410		16.8	11.7		0.840	5.15		2.52
OB-6	J19YF9	5/13/10	1.17	B	1.74	0.07	B	0.217	5210		17.4	11.7		0.869	5.8		2.61
OB-7	J19YH0	5/13/10	0.805	B	1.71	0.084	B	0.214	4150		17.1	9.84		0.855	4.93		2.56
OB-8 re-sample 1[a]	J1FKL6	3/17/11	1.3	B	0.94	0.064	B	0.039	5160	X	13.6	10.6	X	0.056	6.1	X	0.096
OB-9	J19YH2	5/13/10	0.752	B	1.55	0.193	U	0.193	4190		15.5	9.58		0.773	4.95		2.32
OB-10	J19YH3	5/13/10	0.843	B	1.87	0.233	U	0.233	5630		18.7	9.93		0.933	5.27		2.80
OB-11	J19YH4	5/13/10	1.34	B	1.71	0.064	B	0.214	5250		17.1	12.8		0.854	5.88		2.56
OB-12	J19YH5	5/13/10	1.15	B	1.55	0.039	B	0.194	5470		15.5	11.7		0.776	5.39		2.33
OB-13	J1B4H9	5/17/10	2.55		1.30	0.068	B	0.163	5530		13.0	10.3		0.652	5.36		1.96
OB-14	J1B4J0	5/17/10	1.70		1.54	0.042	B	0.193	5670		15.4	11		0.772	4.92		2.32
OB-15	J1B4J1	5/17/10	2.02		1.76	0.057	B	0.220	5740		17.6	11.1		0.881	5.9		2.64
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.86	U	0.86	0.054	B	0.036	5790	X	12.4	8.8	X	0.051	4.9	X	0.088
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	1.0	U	1.0	0.079	B	0.043	5660	X	14.7	9.6	X	0.060	5.1	X	0.10
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.88	B	0.87	0.043	B	0.036	5780	X	12.5	9.2	X	0.051	4.9	X	0.089
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0.95	U	0.95	0.049	B	0.040	5380	X	13.7	9.4	X	0.056	5.2	X	0.097
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.85	U	0.85	0.077	B	0.036	4860	X	12.2	6.1	X	0.050	4.5	X	0.087
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	6.9		0.87	0.15	B	0.036	5800	X	12.4	11.0	X	0.051	6.3	X	0.088
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	2.1		0.88	0.11	B	0.037	4130	X	12.7	9.6	X	0.052	6.0	X	0.090
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	1.7	B	1.0	0.12	B	0.043	5220	X	14.7	11.9	X	0.061	7.2	X	0.10
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	1.2	B	1.0	0.10	B	0.043	12100	X	14.9	10.5	X	0.061	7.2	X	0.11
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	1.4	B	0.99	0.14	B	0.041	4170	X	14.2	13.1	X	0.058	7.9	X	0.10
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0.96	U	0.96	0.059	B	0.040	4320	X	13.9	9.4	X	0.057	6.7	X	0.098
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.84	U	0.84	0.077	B	0.035	4910	X	12.1	9.4	X	0.050	6.8	X	0.086
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	1.8		0.88	0.12	B	0.037	4960	X	12.7	11.6	X	0.052	6.8	X	0.090
Equipment Blank	J19YK0	5/17/10	1.49	U	1.49	0.186	U	0.19	29.6		14.9	0.18	B	0.74	2.23	U	2.23
Equipment Blank	J1FKN0	3/17/11	0.9	U	0.85	0.035	U	0.035	56.6	XC	12.2	0.29	X	0.050	1.4	X	0.086
Equipment Blank	J1HH87	4/13/11	0.85	U	0.85	0.036	U	0.036	62.3		12.3	0.22	C	0.050	0.1	BX	0.087

Attachment	1	Sheet No.	8 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Copper			Hexavalent Chromium			Iron			Lead			Magnesium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	12.7		1.63	0.20	U	0.20	16200		16.3	13.1		0.813	4170		4.07
Duplicate of J19YF8	J19YH6	5/13/10	12.7		1.90	0.16	B	0.20	15800		19.0	13.0		0.951	4130		4.76
OB-1	J19YF4	5/13/10	13.5		1.44	0.15	B	0.20	16600		14.4	6.95		0.722	4520		3.61
OB-2	J19YF5	5/13/10	14.3		1.82	0.11	B	0.20	16700		18.2	10.3		0.912	4360		4.56
OB-3	J19YF6	5/13/10	13.5		1.71	0.18	B	0.20	17100		17.1	17.6		0.854	4020		4.27
OB-4	J19YF7	5/13/10	13.8		1.68	0.15	B	0.20	16400		16.8	7.44		0.840	4250		4.20
OB-6	J19YF9	5/13/10	13.2		1.74	0.14	B	0.20	18000		17.4	25.2		0.869	4020		4.34
OB-7	J19YH0	5/13/10	13.4		1.71	0.20	B	0.20	14600		17.1	16.8		0.855	3530		4.27
OB-8 re-sample 1[a]	J1FKL6	3/17/11	13.6		0.21	0.184		0.154	15500	X	3.7	17.9	X	0.26	3990	X	3.6
OB-9	J19YH2	5/13/10	11.7		1.55	0.12	B	0.20	15300		15.5	8.91		0.773	3670		3.86
OB-10	J19YH3	5/13/10	12.4		1.87	0.17	B	0.20	14300		18.7	11.3		0.933	3790		4.66
OB-11	J19YH4	5/13/10	14.5		1.71	0.15	B	0.20	17600		17.1	22.4		0.854	4120		4.27
OB-12	J19YH5	5/13/10	13.4		1.55	0.11	B	0.20	16500		15.5	14.0		0.776	4300		3.88
OB-13	J1B4H9	5/17/10	12.9		1.30	0.20	U	0.20	16800		13	10.5		0.652	3750		3.26
OB-14	J1B4J0	5/17/10	12.2		1.54	0.20	U	0.20	15300		15.4	12.3		0.772	3440		3.86
OB-15	J1B4J1	5/17/10	13.6		1.76	0.20	U	0.20	17200		17.6	14.3		0.881	4000		4.41
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	12.3		0.19	0.154	U	0.154	12900	X	3.3	2.7	X	0.24	3760	X	3.3
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	11.4		0.23	0.154	U	0.154	13100	X	4.0	2.4	X	0.28	4040	X	3.8
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	11.3		0.19	0.154	U	0.154	13000	X	3.4	2.0	X	0.24	3940	X	3.3
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	12.1		0.21	0.154	U	0.154	13400	X	3.7	2.1	X	0.26	4010	X	3.6
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	12.5		0.19	0.151	U	0.151	11300	X	3.3	2.3	X	0.23	2900	X	3.2
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	15.9		0.19	0.153	U	0.153	15600	X	3.4	30.7	X	0.24	4310	X	3.3
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	13.5		0.19	0.155	U	0.155	15000	X	3.4	35.3	X	0.24	3760	X	3.3
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	15.6		0.23	0.153	U	0.153	19000	X	4.0	70.5	X	0.28	4260	X	3.9
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	17.0		0.23	0.154	U	0.154	20400	X	4.0	20.0	X	0.29	4790	X	3.9
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	14.9		0.22	0.154	U	0.154	19900	X	3.8	32.7	X	0.27	4600	X	3.7
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	14.0		0.21	0.154	U	0.154	17700	X	3.7	5.5	X	0.27	3650	X	3.6
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	12.9		0.19	0.154	U	0.154	18100	X	3.3	2.3	X	0.23	3370	X	3.2
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	14.0		0.20	0.154	U	0.154	18000	X	3.4	58.5	X	0.24	4100	X	3.3
Equipment Blank	J19YK0	5/17/10	1.49	U	1.49				240		14.9	0.426	B	0.74	18.4		3.71
Equipment Blank	J1FKN0	3/17/11	0.33	B	0.19				1920	X	3.3	1.5	X	0.23	29.6	X	3.2
Equipment Blank	J1HH87	4/13/11	0.19	B	0.19				465		3.3	0.41	BX	0.23	35.1		3.2

Attachment	1	Sheet No.	9 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Manganese			Mercury			Molybdenum			Nickel			Potassium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	250		0.813	0.024	U	0.024	0.200	B	0.813	11.1		2.03	819		81.3
Duplicate of J19YF8	J19YH6	5/13/10	239		0.951	0.028	U	0.028	0.951	U	0.951	10.6		2.38	742		95.1
OB-1	J19YF4	5/13/10	266		0.722	0.025	U	0.025	0.250	B	0.722	10.9		1.80	741		72.2
OB-2	J19YF5	5/13/10	259		0.912	0.028	U	0.028	0.352	B	0.912	11.0		2.28	822		91.2
OB-3	J19YF6	5/13/10	251		0.854	0.025	U	0.025	0.232	B	0.854	10.1		2.13	970		85.4
OB-4	J19YF7	5/13/10	256		0.840	0.025	U	0.025	0.276	B	0.840	10.5		2.10	782		84.0
OB-6	J19YF9	5/13/10	272		0.869	0.025	U	0.025	0.313	B	0.869	9.82		2.17	1240		86.9
OB-7	J19YH0	5/13/10	220		0.855	0.026	U	0.026	0.227	B	0.855	9.49		2.14	807		85.5
OB-8 re-sample 1[a]	J1FKL6	3/17/11	253	X	0.096	0.0053	U	0.0053	0.25	U	0.25	10.3	X	0.12	917		39.4
OB-9	J19YH2	5/13/10	224		0.773	0.028	U	0.028	0.167	B	0.773	8.89		1.93	762		77.3
OB-10	J19YH3	5/13/10	244		0.933	0.026	U	0.026	0.933	U	0.933	9.11		2.33	770		93.3
OB-11	J19YH4	5/13/10	276		0.854	0.025	U	0.025	0.199	B	0.854	11.6		2.14	1280		85.4
OB-12	J19YH5	5/13/10	248		0.776	0.028	U	0.028	0.209	B	0.776	11.9		1.94	973		77.6
OB-13	J1B4H9	5/17/10	250		0.652	0.026	U	0.026	0.272	B	0.652	9.50		1.63	1050		65.2
OB-14	J1B4J0	5/17/10	227		0.772	0.026	U	0.026	0.308	B	0.772	9.29		1.93	955		77.2
OB-15	J1B4J1	5/17/10	262		0.881	0.023	U	0.023	0.289	B	0.881	11.8		2.2	1080		88.1
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	222	X	0.088	0.0054	U	0.0054	0.23	U	0.23	8.3	X	0.11	601		36.1
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	225	X	0.10	0.0052	U	0.0052	0.27	U	0.27	10.3	X	0.13	689		42.6
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	218	X	0.089	0.0056	U	0.0056	0.23	U	0.23	9.4	X	0.11	650		36.4
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	231	X	0.097	0.0056	U	0.0056	0.25	U	0.25	10.5	X	0.12	612		39.8
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	182	X	0.087	0.0058	U	0.0058	0.23	U	0.23	7.0	X	0.11	487		35.5
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	254	X	0.088	0.013	B	0.0056	0.33	B	0.23	10.8	X	0.11	1150		36.2
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	252	X	0.090	0.0080	B	0.0057	0.23	U	0.23	9.5	X	0.11	1180		36.8
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	300	X	0.10	0.0083	B	0.0060	0.27	U	0.27	11.2	X	0.13	1430		42.8
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	286	X	0.11	0.014	B	0.0056	0.28	U	0.28	9.7	X	0.13	1190		43.4
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	362	X	0.10	0.0053	U	0.0053	0.26	U	0.26	12.8	X	0.12	1750		41.3
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	230	X	0.098	0.0054	U	0.0054	0.26	U	0.26	10.2	X	0.12	638		40.3
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	241	X	0.086	0.0057	U	0.0057	0.22	U	0.22	8.0	X	0.11	509		35.1
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	294	X	0.090	0.011	BN	0.0054	0.23	U	0.23	10.6	X	0.11	1310		36.9
Equipment Blank	J19YK0	5/17/10	4.5		0.74	0.025	U	0.025	0.743	U	0.743	1.86	U	1.86	47	B	74.3
Equipment Blank	J1FKN0	3/17/11	111	X	0.086	0.0054	U	0.0054	0.22	U	0.22	0.40	BX	0.11	58.7	B	35.4
Equipment Blank	J1HH87	4/13/11	4.9		0.087	0.0053	U	0.0053	0.23	U	0.23	0.22	BX	0.11	57.3	B	35.7

Attachment	1	Sheet No.	10 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Selenium			Silicon			Silver			Sodium			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	0.244	U	0.244	172		4.88	0.813	U	0.813	190		40.7	42.5		0.813
Duplicate of J19YF8	J19YH6	5/13/10	0.285	U	0.285	196		5.71	0.951	U	0.951	190		47.6	39.5		0.951
OB-1	J19YF4	5/13/10	0.217	U	0.217	136		4.33	0.722	U	0.722	206		36.1	41.7		0.722
OB-2	J19YF5	5/13/10	0.274	U	0.274	213		5.47	0.912	U	0.912	191		45.6	46.4		0.912
OB-3	J19YF6	5/13/10	0.256	U	0.256	188		5.12	0.854	U	0.854	182		42.7	45.3		0.854
OB-4	J19YF7	5/13/10	0.252	U	0.252	187		5.04	0.840	U	0.840	174		42.0	43.6		0.840
OB-6	J19YF9	5/13/10	0.261	U	0.261	181		5.21	0.869	U	0.869	201		43.4	46.5		0.869
OB-7	J19YH0	5/13/10	0.256	U	0.256	177		5.13	0.855	U	0.855	163		42.7	38.8		0.855
OB-8 re-sample 1[a]	J1FKL6	3/17/11	0.83	U	0.83	224	N	5.4	0.15	U	0.15	235		56.7	42.1		0.090
OB-9	J19YH2	5/13/10	0.232	U	0.232	161		4.64	0.773	U	0.773	159		38.6	41.5		0.773
OB-10	J19YH3	5/13/10	0.280	U	0.280	200		5.6	0.933	U	0.933	180		46.6	39.4		0.933
OB-11	J19YH4	5/13/10	0.256	U	0.256	163		5.13	0.854	U	0.854	172		42.7	45.5		0.854
OB-12	J19YH5	5/13/10	0.233	U	0.233	178		4.66	0.776	U	0.776	178		38.8	44.8		0.776
OB-13	J1B4H9	5/17/10	0.196	U	0.196	470		3.91	0.138	B	0.652	187		32.6	45.1		0.652
OB-14	J1B4J0	5/17/10	0.232	U	0.232	434		4.63	0.156	B	0.772	173		38.6	42.1		0.772
OB-15	J1B4J1	5/17/10	0.264	U	0.264	501		5.29	0.881	U	0.881	220		44.1	44.9		0.881
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.76	U	0.76	164	N	5.0	0.14	U	0.14	185		52.0	35.8		0.083
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.89	U	0.89	195	N	5.9	0.17	U	0.17	203		61.4	38.0		0.098
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.76	U	0.76	153	N	5.0	0.14	U	0.14	190		52.3	36.8		0.083
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0.83	U	0.83	154	N	5.5	0.16	U	0.16	180		57.3	38.4		0.091
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.75	U	0.75	144	N	4.9	0.14	U	0.14	184		51.2	36.4		0.081
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.76	U	0.76	306	N	5.0	0.14	U	0.14	287		52.1	41.1		0.083
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.77	U	0.77	246	N	5.1	0.14	U	0.14	190		53.0	36.1		0.084
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.90	U	0.90	269	N	5.9	0.17	U	0.17	226		61.6	46.4		0.098
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.91	U	0.91	221	N	6.0	0.17	U	0.17	292		62.4	59.2		0.099
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0.87	U	0.87	359	N	5.7	0.16	U	0.16	230		59.5	45.4		0.095
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0.85	U	0.85	190	N	5.6	0.16	U	0.16	315		58.0	49.8		0.092
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.74	U	0.74	167	N	4.8	0.14	U	0.14	268		50.5	53.3		0.080
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.77	U	0.77	242	N	5.1	0.14	U	0.14	208		53.1	45.8		0.085
Equipment Blank	J19YK0	5/17/10	0.223	U	0.22	171		4.46	0.743	U	0.743	37.1	U	37.1	0.27	B	0.74
Equipment Blank	J1FKN0	3/17/11	0.74	U	0.74	90.8	N	4.9	0.14	U	0.14	50.9	U	50.9	0.69	B	0.081
Equipment Blank	J1HH87	4/13/11	0.75	U	0.75	119		4.9	0.14	U	0.14	51.3	U	51.3	0.87	B	0.082

Attachment	1	Sheet No.	11 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results

Sample Location	HEIS Number	Sample Date	Zinc		
			mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	32.2		2.44
Duplicate of J19YF8	J19YH6	5/13/10	31.2		2.85
OB-1	J19YF4	5/13/10	32.8		2.17
OB-2	J19YF5	5/13/10	41.2		2.74
OB-3	J19YF6	5/13/10	33.3		2.56
OB-4	J19YF7	5/13/10	33.2		2.52
OB-6	J19YF9	5/13/10	39.0		2.61
OB-7	J19YH0	5/13/10	55.3		2.56
OB-8 re-sample 1[a]	J1FKL6	3/17/11	34.3	X	0.38
OB-9	J19YH2	5/13/10	30.1		2.32
OB-10	J19YH3	5/13/10	29.4		2.80
OB-11	J19YH4	5/13/10	44.4		2.56
OB-12	J19YH5	5/13/10	33.1		2.33
OB-13	J1B4H9	5/17/10	59.6		1.96
OB-14	J1B4J0	5/17/10	37.0		2.32
OB-15	J1B4J1	5/17/10	49.4		2.64
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	28.4	X	0.35
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	28.1	X	0.41
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	26.4	X	0.35
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	27.9	X	0.39
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	25.7	X	0.35
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	40.6	X	0.35
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	36.4	X	0.36
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	44.8	X	0.42
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	44.6	X	0.42
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	48.6	X	0.40
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	32.8	X	0.39
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	32.9	X	0.34
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	43.5	X	0.36
Equipment Blank	J19YK0	5/17/10	2.23	U	2.23
Equipment Blank	J1FKN0	3/17/11	4.8	X	0.34
Equipment Blank	J1HH87	4/13/11	1.4	C	0.35

Attachment	1	Sheet No.	12 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-9	J19YC6	5/18/10	7010		19.9	0.993	UJ	0.993	6.51		0.993	54.7		0.50	0.203		0.200
SZ-11	J19YC8	5/18/10	7590		19.2	0.960	U	0.960	4.69		0.960	72.2		0.48	0.235		0.190
DZ-8	J19YD8	5/18/10	5390		19.3	0.967	UJ	0.967	3.23		0.967	56.6		0.48	0.147	B	0.190
DZ-8 re-sample 1	J1FKK8	3/16/11	6320		1.5	0.370	U	0.370	5.70		0.64	42.3		0.074	0.032	U	0.032
DZ-1	J19YD1	5/18/10	5570		14.7	0.737	UJ	0.737	4.46		0.737	42.1		0.37	0.164		0.150
DZ-1 re-sample 1	J1FKK1	3/16/11	6490		1.4	0.350	U	0.350	4.40		0.60	47.2		0.069	0.030	U	0.030
DZ-2	J19YD2	5/18/10	5380		20.7	1.03	UJ	1.03	3.41		1.03	67.9		0.52	0.147	B	0.210
DZ-2 re-sample 1	J1FKK2	3/16/11	5760		1.6	0.390	U	0.390	4.40		0.67	57.6		0.078	0.034	U	0.034
DZ-3	J19YD3	5/18/10	6880		21.0	1.05	UJ	1.05	3.95		1.05	61.4		0.52	0.200	B	0.210
DZ-3 re-sample 1	J1FKK3	3/16/11	8880		1.7	0.420	U	0.420	4.50		0.72	72.5		0.083	0.15	B	0.036
DZ-4	J19YD4	5/18/10	6780		13.9	0.696	UJ	0.696	5.30		0.696	60.8		0.35	0.185		0.140
DZ-4 re-sample 1	J1FKK4	3/16/11	5760		1.5	0.380	U	0.380	2.00		0.66	60.4		0.076	0.033	U	0.033
DZ-5	J19YD5	5/18/10	7410		15.8	0.788	UJ	0.788	17.7		0.788	57.6		0.39	0.211		0.160
DZ-6	J19YD6	5/18/10	6400		14.3	0.262	JB	0.713	5.99		0.713	47.7		0.36	0.176		0.140
DZ-7	J19YD7	5/18/10	7710		15.9	0.453	JB	0.794	8.10		0.794	57.1		0.40	0.199		0.160
DZ-7 re-sample 1	J1FKK7	3/16/11	6340		1.5	0.370	U	0.370	7.80		0.64	44.4		0.074	0.046	B	0.032
DZ-9	J19YD9	5/18/10	5790		17.4	0.870	UJ	0.870	5.10		0.870	50.7		0.44	0.174		0.170
DZ-10	J19YF0	5/18/10	5250		15.0	0.748	UJ	0.748	4.68		0.748	59.7		0.37	0.157		0.150
DZ-11	J19YF1	5/18/10	6470		16.8	0.842	U	0.842	5.85		0.842	58.2		0.42	0.191		0.170
DZ-12	J19YF2	5/18/10	6360		15.6	0.780	U	0.780	5.39		0.780	51.9		0.39	0.179		0.160
Duplicate of J19YD1	J19YF3	5/18/10	5830		18.6	0.929	U	0.929	5.30		0.929	45.4		0.47	0.164	B	0.190
Duplicate of J1FKK8	J1FKL3	3/16/11	6330		1.5	0.370	U	0.370	6.10		0.64	41.3		0.074	0.032	B	0.032
OB-8	J19YH1	5/13/10	6530		19.1	0.454	B	0.953	8.03		0.953	50		0.48	0.181	B	0.190
SPA-8	J19YJ4	5/17/10	7140		13.3	0.346	B	0.663	7.32		0.663	66.8		0.33	0.210		0.130
Duplicate of J19YJ4	J19YJ9	5/17/10	7420		16.3	0.813	U	0.813	7.94		0.813	69.3		0.41	0.229		0.160
SPA-1	J19YH7	5/17/10	5600		17.0	0.297	B	0.850	2.41		0.850	42.1		0.43	0.142	B	0.170
SPA-2	J19YH8	5/17/10	9000		14.3	0.290	B	0.717	4.14		0.717	75.1		0.36	0.269		0.140
SPA-3	J19YH9	5/17/10	9700		16.2	0.331	B	0.811	4.38		0.811	84		0.41	0.293		0.160
SPA-4	J19YJ0	5/17/10	6850		12.9	0.288	B	0.644	2.53		0.644	54.6		0.32	0.181		0.130
SPA-5	J19YJ1	5/17/10	8470		16.2	0.286	B	0.810	4.07		0.810	74.4		0.41	0.260		0.160
SPA-6	J19YJ2	5/17/10	6710		15.5	0.334	B	0.776	5.25		0.776	82.3		0.39	0.226		0.160
SPA-7	J19YJ3	5/17/10	7450		15.0	0.329	B	0.748	6.25		0.748	63.2		0.37	0.196		0.150
SPA-9	J19YJ5	5/17/10	7060		12.6	0.281	B	0.628	6.11		0.628	76.8		0.31	0.216		0.130
SPA-10	J19YJ6	5/17/10	6080		14.0	0.253	B	0.699	5.96		0.699	77.5		0.35	0.190		0.140
SPA-11	J19YJ7	5/17/10	7710		14.0	0.393	B	0.701	8.71		0.701	66.7		0.35	0.227		0.140
SPA-12	J19YJ8	5/17/10	7290		12.7	0.299	B	0.636	14.2		0.636	69.5		0.32	0.218		0.130

Attachment	1	Sheet No.	13 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data.

Sample Location	HEIS Number	Sample Date	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
SZ-9	J19YC6	5/18/10	1.86	B	1.99	0.059	B	0.248	5670		19.9	10.9		0.993	5.75		2.98
SZ-11	J19YC8	5/18/10	2.92		1.92	0.098	B	0.240	5990		19.2	15.1		0.960	5.96		2.88
DZ-8	J19YD8	5/18/10	0.888	B	1.93	0.065	B	0.242	4450		19.3	8.55		0.967	4.97		2.90
DZ-8 re-sample 1	J1FKK8	3/16/11	0.95	U	0.95	0.040	U	0.040	4240		13.7	9.70		0.056	4.90	X	0.097
DZ-1	J19YD1	5/18/10	1.10	B	1.47	0.057	B	0.184	5100		14.7	8.71		0.737	5.03		2.21
DZ-1 re-sample 1	J1FKK1	3/16/11	0.89	U	0.89	0.037	U	0.037	4820		12.9	11.2		0.053	6.40	X	0.091
DZ-2	J19YD2	5/18/10	0.801	B	2.07	0.088	B	0.258	5120		20.7	10.7		1.03	7.58		3.1
DZ-2 re-sample 1	J1FKK2	3/16/11	1.00	U	1.00	0.042	U	0.042	4620		14.4	9.10		0.059	5.50	X	0.10
DZ-3	J19YD3	5/18/10	1.60	B	2.10	0.262	U	0.262	5660		21.0	15.6		1.05	5.96		3.15
DZ-3 re-sample 1	J1FKK3	3/16/11	1.10	U	1.10	0.045	U	0.045	6540		15.5	16.3		0.064	6.10	X	0.11
DZ-4	J19YD4	5/18/10	1.44		1.39	0.061	B	0.174	6420		13.9	11.5		0.696	5.77		2.09
DZ-4 re-sample 1	J1FKK4	3/16/11	0.98	U	0.98	0.041	U	0.041	4220		14.1	11.5		0.058	5.80	X	0.10
DZ-5	J19YD5	5/18/10	1.22	B	1.58	0.069	B	0.197	5060		15.8	11.3		0.788	5.80		2.36
DZ-6	J19YD6	5/18/10	1.08	B	1.43	0.048	B	0.178	5340		14.3	11.1		0.713	5.47		2.14
DZ-7	J19YD7	5/18/10	1.46	B	1.59	0.13	B	0.198	7540		15.9	19.9		0.794	5.88		2.38
DZ-7 re-sample 1	J1FKK7	3/16/11	0.95	U	0.95	0.040	U	0.040	4180		13.7	9.00		0.056	4.80	X	0.097
DZ-9	J19YD9	5/18/10	1.25	B	1.74	0.058	B	0.218	4660		17.4	9.92		0.870	5.87		2.61
DZ-10	J19YF0	5/18/10	0.902	B	1.50	0.055	B	0.187	4590		15.0	7.37		0.748	6.19		2.25
DZ-11	J19YF1	5/18/10	1.18	B	1.68	0.132	B	0.210	5760		16.8	12		0.842	5.35		2.53
DZ-12	J19YF2	5/18/10	1.07	B	1.56	0.115	B	0.195	5590		15.6	10.3		0.780	5.36		2.34
Duplicate of J19YD1	J19YF3	5/18/10	1.15	B	1.86	0.097	B	0.232	5360		18.6	9.56		0.929	5.58		2.79
Duplicate of J1FKK8	J1FKL3	3/16/11	0.96	U	0.96	0.040	U	0.040	4630		13.8	9.20		0.057	5.10	X	0.098
OB-8	J19YH1	5/13/10	1.07	B	1.91	0.238	U	0.238	5740		19.1	10.9		0.953	5.79		2.86
SPA-8	J19YJ4	5/17/10	3.26		1.33	0.082	B	0.166	4390		13.3	11.2		0.663	5.67		1.99
Duplicate of J19YJ4	J19YJ9	5/17/10	3.47		1.63	0.092	B	0.203	4500		16.3	11.1		0.813	5.96		2.44
SPA-1	J19YH7	5/17/10	1.26	B	1.70	0.212	U	0.212	6170		17.0	9.89		0.850	4.98		2.55
SPA-2	J19YH8	5/17/10	2.11		1.43	0.050	B	0.179	4580		14.3	12.3		0.717	6.44		2.15
SPA-3	J19YH9	5/17/10	2.25		1.62	0.050	B	0.203	4270		16.2	12.2		0.811	6.86		2.43
SPA-4	J19YJ0	5/17/10	1.31		1.29	0.035	B	0.161	4450		12.9	10.7		0.644	5.44		1.93
SPA-5	J19YJ1	5/17/10	2.16		1.62	0.056	B	0.202	3700		16.2	11.1		0.810	6.09		2.43
SPA-6	J19YJ2	5/17/10	6.47		1.55	0.141	B	0.194	4690		15.5	10.1		0.776	5.34		2.33
SPA-7	J19YJ3	5/17/10	2.55		1.50	0.051	B	0.187	6240		15.0	13		0.748	5.83		2.24
SPA-9	J19YJ5	5/17/10	4.16		1.26	0.104	B	0.157	4430		12.6	11.5		0.628	5.70		1.88
SPA-10	J19YJ6	5/17/10	4.84		1.40	0.105	B	0.175	3950		14.0	10.1		0.699	4.84		2.10
SPA-11	J19YJ7	5/17/10	3.03		1.40	0.083	B	0.175	4480		14.0	11.7		0.701	5.87		2.10
SPA-12	J19YJ8	5/17/10	3.32		1.27	0.091	B	0.159	5100		12.7	11.3		0.636	6.05		1.91

Attachment	1	Sheet No.	14 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data.

Sample Location	HEIS Number	Sample Date	Copper			Hexavalent Chromium			Iron			Lead			Magnesium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-9	J19YC6	5/18/10	13.3		1.99	0.21	U	0.21	17300		19.9	19.3		0.993	4230		4.97
SZ-11	J19YC8	5/18/10	12.2		1.92	0.21	U	0.21	17900		19.2	7.84		0.960	5260		4.80
DZ-8	J19YD8	5/18/10	11.9		1.93	0.21	U	0.21	15500		19.3	7.78		0.967	3270		4.83
DZ-8 re-sample 1	J1FKK8	3/16/11	12.4		0.21				13100	X	3.70	19.4		0.26	3750		3.60
DZ-1	J19YD1	5/18/10	12.8		1.47	0.21	U	0.21	15500		14.7	12.5		0.737	3430		3.68
DZ-1 re-sample 1	J1FKK1	3/16/11	13.1		0.20				13900	X	3.50	11.7		0.25	4220		3.40
DZ-2	J19YD2	5/18/10	13.6		2.07	0.21	U	0.21	20400		20.7	7.09		1.03	4290		5.17
DZ-2 re-sample 1	J1FKK2	3/16/11	13.5		0.22				14700	X	3.90	12.1		0.28	3630		3.80
DZ-3	J19YD3	5/18/10	12.8		2.10	0.21	U	0.21	18600		21.0	7.83		1.05	4410		5.24
DZ-3 re-sample 1	J1FKK3	3/16/11	13.9		0.24				15500	X	4.20	10.5		0.30	5360		4.10
DZ-4	J19YD4	5/18/10	13.4		1.39	0.21	U	0.21	17500		13.9	13.1		0.696	4250		3.48
DZ-4 re-sample 1	J1FKK4	3/16/11	14.6		0.22				15300	X	3.80	7.40		0.27	3690		3.70
DZ-5	J19YD5	5/18/10	13.5		1.58	0.21	U	0.21	17800		15.8	58.2		0.788	4230		3.94
DZ-6	J19YD6	5/18/10	13.8		1.43	0.21	U	0.21	16500		14.3	15.5		0.713	4120		3.56
DZ-7	J19YD7	5/18/10	14.9		1.59	0.21	U	0.21	18300		15.9	22.8		0.794	4270		3.97
DZ-7 re-sample 1	J1FKK7	3/16/11	12.4		0.21				13200	X	3.70	24.5		0.26	3850		3.60
DZ-9	J19YD9	5/18/10	13.4		1.74	0.21	U	0.21	17800		17.4	14.4		0.870	4120		4.35
DZ-10	J19YF0	5/18/10	14.1		1.50	0.21	U	0.21	17000		15.0	12.7		0.748	3130		3.74
DZ-11	J19YF1	5/18/10	14.9		1.68	0.21	U	0.21	17400		16.8	15.8		0.842	3970		4.21
DZ-12	J19YF2	5/18/10	13.6		1.56	0.21	U	0.21	17000		15.6	14.7		0.780	4250		3.90
Duplicate of J19YD1	J19YF3	5/18/10	12.7		1.86	0.21	U	0.21	16200		18.6	14.3		0.929	3950		4.65
Duplicate of J1FKK8	J1FKL3	3/16/11	11.7		0.21				13100	X	3.70	22.7		0.26	4020		3.6
OB-8	J19YH1	5/13/10	15		1.91	0.08	B	0.20	17400		19.1	23.9		0.953	4230		4.77
SPA-8	J19YJ4	5/17/10	13.6		1.33	0.20	U	0.20	17300		13.3	56.5		0.663	3910		3.32
Duplicate of J19YJ4	J19YJ9	5/17/10	14.8		1.63	0.20	U	0.20	17800		16.3	59.8		0.813	3960		4.06
SPA-1	J19YH7	5/17/10	11.6		1.70	0.20	U	0.20	15400		17.0	4.63		0.850	3980		4.25
SPA-2	J19YH8	5/17/10	13.3		1.43	0.20	U	0.20	19900		14.3	9.70		0.717	4190		3.59
SPA-3	J19YH9	5/17/10	13.6		1.62	0.20	U	0.20	20600		16.2	9.45		0.811	4330		4.06
SPA-4	J19YJ0	5/17/10	12.2		1.29	0.20	U	0.20	16900		12.9	3.61		0.644	3880		3.22
SPA-5	J19YJ1	5/17/10	12.1		1.62	0.20	U	0.20	18000		16.2	9.15		0.810	3850		4.05
SPA-6	J19YJ2	5/17/10	15.3		1.55	0.20	U	0.20	16600		15.5	32.9		0.776	3520		3.88
SPA-7	J19YJ3	5/17/10	13.6		1.50	0.20	U	0.20	17500		15.0	19.3		0.748	4410		3.74
SPA-9	J19YJ5	5/17/10	14.1		1.26	0.20	U	0.20	17000		12.6	43.4		0.628	3890		3.14
SPA-10	J19YJ6	5/17/10	14.6		1.40	0.20	U	0.20	15300		14.0	42.8		0.699	3460		3.49
SPA-11	J19YJ7	5/17/10	12.9		1.40	0.20	U	0.20	18300		14.0	65.6		0.701	4190		3.51
SPA-12	J19YJ8	5/17/10	13.3		1.27	0.20	U	0.20	17800		12.7	87.1		0.636	3800		3.18

Attachment	1	Sheet No.	15 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data.

Sample Location	HEIS Number	Sample Date	Manganese			Mercury			Molybdenum			Nickel			Potassium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-9	J19YC6	5/18/10	261		0.993	0.020	B	0.030	0.248	B	0.993	10.3		2.48	1070		99.3
SZ-11	J19YC8	5/18/10	258		0.960	0.027	U	0.027	0.271	B	0.960	13.4		2.40	924		96.0
DZ-8	J19YD8	5/18/10	230		0.967	0.012	B	0.030	0.248	B	0.967	8.37		2.42	821		96.7
DZ-8 re-sample 1	J1FKK8	3/16/11	219		0.097	0.0055	U	0.0055	0.250	U	0.25	9.50	X	0.12	808		39.9
DZ-1	J19YD1	5/18/10	220		0.737	0.011	B	0.030	0.213	B	0.737	7.68		1.84	769		73.7
DZ-1 re-sample 1	J1FKK1	3/16/11	217		0.091	0.0056	U	0.0056	0.370	B	0.24	12.5	X	0.11	850		37.4
DZ-2	J19YD2	5/18/10	269		1.03	0.011	B	0.030	0.288	B	1.03	12.1		2.58	658		103
DZ-2 re-sample 1	J1FKK2	3/16/11	230		0.10	0.0054	U	0.0054	0.490	B	0.27	9.40	X	0.13	829		41.9
DZ-3	J19YD3	5/18/10	259		1.05	0.012	B	0.030	0.315	B	1.05	12		2.62	978		105
DZ-3 re-sample 1	J1FKK3	3/16/11	271		0.11	0.0082	B	0.0059	0.290	U	0.29	15.4	X	0.13	1320		45.0
DZ-4	J19YD4	5/18/10	264		0.696	0.010	B	0.030	0.299	B	0.696	9.86		1.74	975		69.6
DZ-4 re-sample 1	J1FKK4	3/16/11	223		0.10	0.0052	U	0.0052	0.260	U	0.26	9.60	X	0.12	809		40.9
DZ-5	J19YD5	5/18/10	274		0.788	0.015	B	0.030	0.202	B	0.788	9.92		1.97	1110		78.8
DZ-6	J19YD6	5/18/10	251		0.713	0.009	B	0.030	0.264	B	0.713	9.93		1.78	844		71.3
DZ-7	J19YD7	5/18/10	283		0.794	0.159		0.030	0.320	B	0.794	10.4		1.98	985		79.4
DZ-7 re-sample 1	J1FKK7	3/16/11	230		0.097	0.0052	U	0.0052	0.250	U	0.25	10.1	X	0.12	843		39.9
DZ-9	J19YD9	5/18/10	247		0.870	0.025	U	0.025	0.367	B	0.870	13.7		2.18	731		87.0
DZ-10	J19YF0	5/18/10	257		0.748	0.026	U	0.026	0.239	B	0.748	7.11		1.87	735		74.8
DZ-11	J19YF1	5/18/10	262		0.842	0.026	U	0.026	0.617	B	0.842	9.14		2.10	892		84.2
DZ-12	J19YF2	5/18/10	251		0.780	0.010	B	0.030	0.262	B	0.780	9.58		1.95	840		78.0
Duplicate of J19YD1	J19YF3	5/18/10	246		0.929	0.027		0.030	0.346	B	0.929	8.62		2.32	802		92.9
Duplicate of J1FKK8	J1FKL3	3/16/11	251		0.098	0.0056	U	0.0056	0.250	U	0.25	9.90	X	0.12	780		40.0
OB-8	J19YH1	5/13/10	260		0.953	0.024	U	0.024	0.229	B	0.953	10.7		2.38	1070		95.3
SPA-8	J19YJ4	5/17/10	262		0.663	0.028	U	0.028	0.364	B	0.663	9.91		1.66	1410		66.3
Duplicate of J19YJ4	J19YJ9	5/17/10	271		0.813	0.026	U	0.026	0.401	B	0.813	10.2		2.03	1510		81.3
SPA-1	J19YH7	5/17/10	232		0.850	0.026	U	0.026	0.318	B	0.850	9.52		2.12	748		85.0
SPA-2	J19YH8	5/17/10	310		0.717	0.027	U	0.027	0.374	B	0.717	10.7		1.79	1800		71.7
SPA-3	J19YH9	5/17/10	330		0.811	0.028	U	0.028	0.331	B	0.811	10.9		2.03	1980		81.1
SPA-4	J19YJ0	5/17/10	260		0.644	0.024	U	0.024	0.282	B	0.644	10.2		1.61	1160		64.4
SPA-5	J19YJ1	5/17/10	289		0.810	0.025	U	0.025	0.338	B	0.810	10.6		2.02	1760		81.0
SPA-6	J19YJ2	5/17/10	247		0.776	0.023	B	0.030	0.495	B	0.776	9.26		1.94	1410		77.6
SPA-7	J19YJ3	5/17/10	259		0.748	0.024	U	0.024	0.344	B	0.748	12		1.87	1200		74.8
SPA-9	J19YJ5	5/17/10	257		0.628	0.015	B	0.030	0.348	B	0.628	11.2		1.57	1250		62.8
SPA-10	J19YJ6	5/17/10	226		0.699	0.057		0.030	0.377	B	0.699	9.57		1.75	1190		69.9
SPA-11	J19YJ7	5/17/10	275		0.701	0.025	U	0.025	0.304	B	0.701	10.4		1.75	1520		70.1
SPA-12	J19YJ8	5/17/10	263		0.636	0.026	U	0.026	0.312	B	0.636	10.3		1.59	1720		63.6

Attachment	1	Sheet No.	16 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data.

Sample Location	HEIS Number	Sample Date	Selenium			Silicon			Silver			Sodium			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-9	J19YC6	5/18/10	0.298	U	0.298	709		5.96	0.993	U	0.993	194		49.7	45.5		0.993
SZ-11	J19YC8	5/18/10	0.288	U	0.288	497		5.76	0.960	U	0.960	256		48.0	41.2		0.960
DZ-8	J19YD8	5/18/10	0.290	U	0.290	552		5.80	0.967	U	0.967	210		48.3	43.3		0.967
DZ-8 re-sample 1	J1FKK8	3/16/11	0.840	U	0.84	224		5.50	0.160	U	0.16	221		57.4	35.1		0.091
DZ-1	J19YD1	5/18/10	0.221	U	0.221	496		4.42	0.737	U	0.737	178		36.8	41.0		0.737
DZ-1 re-sample 1	J1FKK1	3/16/11	1.3		0.78	182	N	5.20	0.150	U	0.15	287		53.8	37.2		0.086
DZ-2	J19YD2	5/18/10	0.310	U	0.310	742		6.20	1.03	U	1.03	285		51.7	59.1		1.03
DZ-2 re-sample 1	J1FKK2	3/16/11	1.6		0.88	202		5.80	0.160	U	0.16	223		60.3	43.1		0.096
DZ-3	J19YD3	5/18/10	0.315	U	0.315	1330		6.29	1.05	U	1.05	267		52.4	47.2		1.05
DZ-3 re-sample 1	J1FKK3	3/16/11	0.940	U	0.94	305		6.20	0.180	U	0.18	240		64.7	34.6		0.10
DZ-4	J19YD4	5/18/10	0.209	U	0.209	1140		4.18	0.696	U	0.696	276		34.8	47.2		0.696
DZ-4 re-sample 1	J1FKK4	3/16/11	0.860	U	0.86	224		5.60	0.160	U	0.16	245		58.8	45.0		0.094
DZ-5	J19YD5	5/18/10	0.236	U	0.236	722		4.73	0.175	B	0.788	212		39.4	45.1		0.788
DZ-6	J19YD6	5/18/10	0.214	U	0.214	634		4.28	0.713	U	0.713	214		35.6	44.3		0.713
DZ-7	J19YD7	5/18/10	0.238	U	0.238	1190		4.76	0.794	U	0.794	247		39.7	49.3		0.794
DZ-7 re-sample 1	J1FKK7	3/16/11	0.840	U	0.84	268		5.50	0.160	U	0.16	211		57.4	32.6		0.091
DZ-9	J19YD9	5/18/10	0.261	U	0.261	507		5.22	0.870	U	0.870	221		43.5	50.2		0.870
DZ-10	J19YF0	5/18/10	0.225	U	0.225	434		4.49	0.748	U	0.748	224		37.4	48.4		0.748
DZ-11	J19YF1	5/18/10	0.253	U	0.253	565		5.05	0.842	U	0.842	245		42.1	45.8		0.842
DZ-12	J19YF2	5/18/10	0.234	U	0.234	394		4.68	0.780	U	0.780	233		39.0	44.1		0.780
Duplicate of J19YD1	J19YF3	5/18/10	0.279	U	0.279	563		5.57	0.929	U	0.929	174		46.5	45.4		0.929
Duplicate of J1FKK8	J1FKL3	3/16/11	0.840	U	0.84	208		5.50	0.160	U	0.16	217		57.6	35.2		0.092
OB-8	J19YH1	5/13/10	0.286	U	0.286	203		5.72	0.953	U	0.953	216		47.7	46.3		0.953
SPA-8	J19YJ4	5/17/10	0.199	U	0.199	433		3.98	0.145	B	0.663	183		33.2	44.8		0.663
Duplicate of J19YJ4	J19YJ9	5/17/10	0.244	U	0.244	637		4.88	0.813	U	0.813	191		40.6	46.1		0.813
SPA-1	J19YH7	5/17/10	0.255	U	0.255	362		5.10	0.85	U	0.850	173		42.5	40.9		0.850
SPA-2	J19YH8	5/17/10	0.215	U	0.215	617		4.30	0.717	U	0.717	200		35.9	47.0		0.717
SPA-3	J19YH9	5/17/10	0.243	U	0.243	753		4.87	0.811	U	0.811	203		40.6	46.3		0.811
SPA-4	J19YJ0	5/17/10	0.193	U	0.193	412		3.86	0.142	B	0.644	175		32.2	43.4		0.644
SPA-5	J19YJ1	5/17/10	0.243	U	0.243	493		4.86	0.810	U	0.810	179		40.5	41.1		0.810
SPA-6	J19YJ2	5/17/10	0.233	U	0.233	527		4.66	0.776	U	0.776	248		38.8	44.5		0.776
SPA-7	J19YJ3	5/17/10	0.224	U	0.224	535		4.49	0.748	U	0.748	220		37.4	43.7		0.748
SPA-9	J19YJ5	5/17/10	0.188	U	0.188	466		3.77	0.628	U	0.628	190		31.4	43.2		0.628
SPA-10	J19YJ6	5/17/10	0.210	U	0.210	442		4.19	0.145	B	0.699	190		34.9	39.1		0.699
SPA-11	J19YJ7	5/17/10	0.210	U	0.210	493		4.21	0.178	B	0.701	182		35.1	45.3		0.701
SPA-12	J19YJ8	5/17/10	0.191	U	0.191	457		3.82	0.157	B	0.636	191		31.8	45.0		0.636

Attachment	1	Sheet No.	17 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data.

Sample Location	HEIS Number	Sample Date	Zinc		
			mg/kg	Q	PQL
SZ-9	J19YC6	5/18/10	35.4		2.98
SZ-11	J19YC8	5/18/10	38.3		2.88
DZ-8	J19YD8	5/18/10	34.0		2.90
DZ-8 re-sample 1	J1FKK8	3/16/11	30.8	X	0.39
DZ-1	J19YD1	5/18/10	32.6		2.21
DZ-1 re-sample 1	J1FKK1	3/16/11	31.9	X	0.36
DZ-2	J19YD2	5/18/10	38.7		3.10
DZ-2 re-sample 1	J1FKK2	3/16/11	34.1	X	0.41
DZ-3	J19YD3	5/18/10	38.2		3.15
DZ-3 re-sample 1	J1FKK3	3/16/11	40.4	X	0.44
DZ-4	J19YD4	5/18/10	36.7		2.09
DZ-4 re-sample 1	J1FKK4	3/16/11	33.6	X	0.40
DZ-5	J19YD5	5/18/10	36.7		2.36
DZ-6	J19YD6	5/18/10	33.4		2.14
DZ-7	J19YD7	5/18/10	70.2		2.38
DZ-7 re-sample 1	J1FKK7	3/16/11	41.6	X	0.39
DZ-9	J19YD9	5/18/10	36.1		2.61
DZ-10	J19YF0	5/18/10	38.0		2.25
DZ-11	J19YF1	5/18/10	41.3		2.53
DZ-12	J19YF2	5/18/10	48.8		2.34
Duplicate of J19YD1	J19YF3	5/18/10	34.6		2.79
Duplicate of J1FKK8	J1FKL3	3/16/11	33.7	X	0.39
OB-8	J19YH1	5/13/10	35.1		2.86
SPA-8	J19YJ4	5/17/10	40.0		1.99
Duplicate of J19YJ4	J19YJ9	5/17/10	41.7		2.44
SPA-1	J19YH7	5/17/10	34.0		2.55
SPA-2	J19YH8	5/17/10	38.8		2.15
SPA-3	J19YH9	5/17/10	39.9		2.43
SPA-4	J19YJ0	5/17/10	32.5		1.93
SPA-5	J19YJ1	5/17/10	37.9		2.43
SPA-6	J19YJ2	5/17/10	45.0		2.33
SPA-7	J19YJ3	5/17/10	37.9		2.24
SPA-9	J19YJ5	5/17/10	41.6		1.88
SPA-10	J19YJ6	5/17/10	38.0		2.10
SPA-11	J19YJ7	5/17/10	42.0		2.10
SPA-12	J19YJ8	5/17/10	41.2		1.91

Attachment	1	Sheet No.	18 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Americium-241 GEA			Barium-133			Carbon-14			Cesium-137			Cobalt-60		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-2	J19YB9	5/18/10	0.184	U	0.184	0.106	U	0.106	0.701	UJ	0.814	0.075	U	0.075	0.072	U	0.072
Duplicate of J19YB9	J19YD0	5/18/10	0.096	U	0.096	0.09	U	0.09	1.2		0.938	0.076	U	0.076	0.086	U	0.086
SZ-1	J19YB8	5/18/10	0.353	U	0.353	0.101	U	0.101	0.772	UJ	0.882	0.089	U	0.089	0.102	U	0.102
SZ-3	J19YC0	5/18/10	0.129	U	0.129	0.065	U	0.065	0.773	UJ	0.799	0.104	U	0.104	0.067	U	0.067
SZ-4	J19YC1	5/18/10	0.09	U	0.09	0.071	U	0.071	0.946	J	0.802	0.067	U	0.067	0.088	U	0.088
SZ-5	J19YC2	5/18/10	0.113	U	0.113	0.112	U	0.112	0.809	UJ	0.97	0.119	U	0.119	0.112	U	0.112
SZ-6	J19YC3	5/18/10	0.324	U	0.324	0.086	U	0.086	0.603	UJ	0.893	0.06	U	0.06	0.064	U	0.064
SZ-7	J19YC4	5/18/10	0.079	U	0.079	0.074	U	0.074	0.874	J	0.805	0.059	U	0.059	0.071	U	0.071
SZ-8	J19YC5	5/18/10	0.326	U	0.326	0.094	U	0.094	0.521	UJ	0.916	0.085	U	0.085	0.096	U	0.096
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	-0.00749	U	0.136	-0.0114	U	0.0239	0.000142	U	0.463	0.0128	U	0.026	-0.00411	U	0.0253
SZ-10	J19YC7	5/18/10	0.115	U	0.115	0.051	U	0.051	0.52	UJ	0.801	0.052	U	0.052	0.064	U	0.064
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	-0.0388	U	0.119	0.0163	U	0.034	-0.0394	U	0.464	0.00519	U	0.0271	-0.00749	U	0.0237
SZ-12	J19YC9	5/18/10	0.049	U	0.049	0.019	U	0.019	0.951		0.867	0.019	U	0.019	0.019	U	0.019
DZ-1	J19YD1	5/18/10	0.074	U	0.074	0.062	U	0.062	0.718	UJ	0.918	0.069	U	0.069	0.086	U	0.086
Duplicate of J19YD1	J19YF3	5/18/10	0.091	U	0.091	0.064	U	0.064	0.903		0.883	0.074	U	0.074	0.085	U	0.085
DZ-2	J19YD2	5/18/10	0.093	U	0.093	0.107	U	0.107	0.203	UJ	0.85	0.089	U	0.089	0.082	U	0.082
DZ-3	J19YD3	5/18/10	0.367	U	0.367	0.102	U	0.102	1.23	J	0.881	0.095	U	0.095	0.108	U	0.108
DZ-4	J19YD4	5/18/10	0.329	U	0.329	0.094	U	0.094	0.534	UJ	0.841	0.078	U	0.078	0.103	U	0.103
DZ-5	J19YD5	5/18/10	0.274	U	0.274	0.083	U	0.083	0.267	UJ	0.961	0.056	U	0.056	0.068	U	0.068
DZ-6	J19YD6	5/18/10	0.313	U	0.313	0.088	U	0.088	1.15	J	0.809	0.089	U	0.089	0.087	U	0.087
DZ-7	J19YD7	5/18/10	0.313	U	0.313	0.09	U	0.09	0.725	UJ	0.83	0.594		0.087	0.145		0.076
DZ-8	J19YD8	5/18/10	0.094	U	0.094	0.064	U	0.064	0.513	UJ	0.881	0.071	U	0.071	0.086	U	0.086
DZ-9	J19YD9	5/18/10	0.117	U	0.117	0.123	U	0.123	0.581	UJ	0.86	0.114	U	0.114	0.095	U	0.095
DZ-10	J19YF0	5/18/10	0.151	U	0.151	0.055	U	0.055	0.509	UJ	0.8	0.055	U	0.055	0.072	U	0.072
DZ-11	J19YF1	5/18/10	0.169	U	0.169	0.062	U	0.062	1.41		0.901	0.066	U	0.066	0.055	U	0.055
DZ-12	J19YF2	5/18/10	0.305	U	0.305	0.096	U	0.096	0.766	U	0.9	0.078	U	0.078	0.086	U	0.086

Attachment	1	Sheet No.	19 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Europium-152			Europium-154			Europium-155			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-2	J19YB9	5/18/10	0.219	U	0.219	0.250	U	0.250	0.199	U	0.199	-0.391	U	3.08	0	U	0.234
Duplicate of J19YB9	J19YD0	5/18/10	0.193	U	0.193	0.274	U	0.274	0.190	U	0.190	0.357	U	2.66	0.174	U	0.277
SZ-1	J19YB8	5/18/10	0.208	U	0.208	0.351	U	0.351	0.182	U	0.182	-0.726	U	3.17	0	U	0.238
SZ-3	J19YC0	5/18/10	0.175	U	0.175	0.224	U	0.224	0.210	U	0.210	0.638	U	2.96	0.027	U	0.263
SZ-4	J19YC1	5/18/10	0.179	U	0.179	0.294	U	0.294	0.149	U	0.149	-0.971	U	3.32	-0.031	U	0.301
SZ-5	J19YC2	5/18/10	0.315	U	0.315	0.334	U	0.334	0.225	U	0.225	-1.27	U	3.22	0.022	U	0.244
SZ-6	J19YC3	5/18/10	0.155	U	0.155	0.180	U	0.180	0.168	U	0.168	-1.42	U	3.02	0	U	0.235
SZ-7	J19YC4	5/18/10	0.161	U	0.161	0.206	U	0.206	0.147	U	0.147	-0.443	U	2.9	0.078	U	0.286
SZ-8	J19YC5	5/18/10	0.199	U	0.199	0.269	U	0.269	0.178	U	0.178	-0.038	U	2.98	0.118	U	0.226
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.018	U	0.060	-0.0255	U	0.0851	0.0622	U	0.0668	-2.08	U	13.8	-0.00582	U	0.139
SZ-10	J19YC7	5/18/10	0.157	U	0.157	0.195	U	0.195	0.121	U	0.121	1.05	U	2.96	0.006	U	0.099
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	-0.024	U	0.0746	-0.0418	U	0.0849	-0.0139	U	0.0892	18.5		14.6	-0.00166	U	0.125
SZ-12	J19YC9	5/18/10	0.052	U	0.052	0.069	U	0.069	0.045	U	0.045	1.28	U	2.97	-0.094	U	0.347
DZ-1	J19YD1	5/18/10	0.174	U	0.174	0.269	U	0.269	0.135	U	0.135	-0.528	U	2.97	0.005	U	0.089
Duplicate of J19YD1	J19YF3	5/18/10	0.192	U	0.192	0.272	U	0.272	0.140	U	0.140	0.44	U	2.98	0.051	U	0.194
DZ-2	J19YD2	5/18/10	0.240	U	0.240	0.278	U	0.278	0.174	U	0.174	-0.578	U	3.03	-0.005	U	0.091
DZ-3	J19YD3	5/18/10	0.230	U	0.230	0.317	U	0.317	0.207	U	0.207	0.524	U	3.17	-0.027	U	0.087
DZ-4	J19YD4	5/18/10	0.209	U	0.209	0.249	U	0.249	0.195	U	0.195	-0.498	U	3.02	-0.005	U	0.098
DZ-5	J19YD5	5/18/10	0.162	U	0.162	0.207	U	0.207	0.184	U	0.184	0.087	U	3.44	0.017	U	0.111
DZ-6	J19YD6	5/18/10	0.182	U	0.182	0.256	U	0.256	0.169	U	0.169	-0.158	U	3.11	0.014	U	0.142
DZ-7	J19YD7	5/18/10	2.28		0.200	0.284	U	0.284	0.245	U	0.245	13.2		3.19	0.006	U	0.114
DZ-8	J19YD8	5/18/10	0.198	U	0.198	0.291	U	0.291	0.145	U	0.145	-0.232	U	3.05	0.005	U	0.047
DZ-9	J19YD9	5/18/10	0.280	U	0.280	0.340	U	0.340	0.256	U	0.256	0	U	2.96	-0.017	U	0.063
DZ-10	J19YF0	5/18/10	0.181	U	0.181	0.253	U	0.253	0.141	U	0.141	0.914	U	3	0	U	0.063
DZ-11	J19YF1	5/18/10	0.182	U	0.182	0.197	U	0.197	0.170	U	0.170	1.5	U	2.8	0.057	U	0.275
DZ-12	J19YF2	5/18/10	0.183	U	0.183	0.294	U	0.294	0.194	U	0.194	1.4	U	2.75	0.082	U	0.392

Attachment	1	Sheet No.	20 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Silver-108 metastable		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-2	J19YB9	5/18/10	0	U	0.234	14.6		0.54	0.683		0.148	1.17		0.266	0.062	U	0.062
Duplicate of J19YB9	J19YD0	5/18/10	0	U	0.222	13		0.676	0.670		0.154	1.09		0.371	0.058	U	0.058
SZ-1	J19YB8	5/18/10	0	U	0.238	13.1		0.746	0.493		0.166	0.638		0.365	0.064	U	0.064
SZ-3	J19YC0	5/18/10	0.027	U	0.210	13.1		0.442	0.409		0.128	0.549		0.276	0.048	U	0.048
SZ-4	J19YC1	5/18/10	0	U	0.241	15.5		0.629	0.448		0.162	0.877		0.328	0.051	U	0.051
SZ-5	J19YC2	5/18/10	0	U	0.169	13.6		1.07	0.585		0.225	0.462		0.452	0.075	U	0.075
SZ-6	J19YC3	5/18/10	-0.025	U	0.188	12.8		0.617	0.536		0.134	0.684		0.242	0.046	U	0.046
SZ-7	J19YC4	5/18/10	0.052	U	0.198	13.3		0.616	0.454		0.133	0.664		0.272	0.049	U	0.049
SZ-8	J19YC5	5/18/10	0	U	0.180	13.8		0.502	0.551		0.138	0.898		0.209	0.053	U	0.053
SZ-9	J19YC6	5/18/10	0	U	0.214	12.5		0.753	0.511		0.132	0.461		0.377	0.066	U	0.066
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	-0.00291	U	0.121										0.00194	U	0.0178
SZ-10	J19YC7	5/18/10	-0.006	U	0.071	10.9		0.531	0.344		0.112	0.424		0.255	0.041	U	0.041
SZ-11	J19YC8	5/18/10	0	U	0.234	15.6		0.392	0.684		0.08	0.868		0.17	0.029	U	0.029
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	-0.00166	U	0.125										-0.0059	U	0.0213
SZ-12	J19YC9	5/18/10	0	U	0.240	12		0.214	0.374		0.039	0.598		0.102	0.014	U	0.014
DZ-1	J19YD1	5/18/10	0.01	U	0.07	15.1		0.78	0.502		0.135	0.800		0.302	0.047	U	0.047
Duplicate of J19YD1	J19YF3	5/18/10	0	U	0.194	15.1		0.852	0.576		0.128	0.539		0.333	0.052	U	0.052
DZ-2	J19YD2	5/18/10	-0.01	U	0.057	9.42		0.79	0.425		0.165	0.349		0.338	0.061	U	0.061
DZ-3	J19YD3	5/18/10	-0.005	U	0.052	12.4		0.859	0.420		0.168	0.739		0.232	0.072	U	0.072
DZ-4	J19YD4	5/18/10	0	U	0.044	10.9		1.35	0.437		0.155	0.654		0.349	0.060	U	0.060
DZ-5	J19YD5	5/18/10	-0.006	U	0.071	11.5		0.709	0.495		0.126	0.828		0.258	0.048	U	0.048
DZ-6	J19YD6	5/18/10	0.007	U	0.055	11.0		1.05	0.505		0.154	0.571		0.314	0.055	U	0.055
DZ-7	J19YD7	5/18/10	0.028	U	0.053	12.0		0.622	0.417		0.166	0.402		0.364	0.054	U	0.054
DZ-8	J19YD8	5/18/10	-0.005	U	0.037	14.2		0.809	0.586		0.142	0.434		0.393	0.052	U	0.052
DZ-9	J19YD9	5/18/10	-0.006	U	0.044	13.2		1.06	0.619		0.24	0.98		0.438	0.082	U	0.082
DZ-10	J19YF0	5/18/10	0	U	0.039	12.4		0.609	0.402		0.111	0.551		0.293	0.047	U	0.047
DZ-11	J19YF1	5/18/10	0.086	U	0.219	13.0		0.588	0.483		0.101	0.641		0.239	0.047	U	0.047
DZ-12	J19YF2	5/18/10	0.041	U	0.313	11.5		0.61	0.490		0.15	0.373	U	0.377	0.066	U	0.066

Attachment	1	Sheet No.	21 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Technetium-99			Thorium-228 GEA			Thorium-232 GEA			Total beta radiostrontium			Tritium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-2	J19YB9	5/18/10	0.036	U	0.391	0.977		0.102	1.17		0.266	-0.045	U	0.316	2.83	J	2.55
Duplicate of J19YB9	J19YD0	5/18/10	-0.043	U	0.388	0.965		0.097	1.09		0.371	-0.050	U	0.236	-0.308	U	3.15
SZ-1	J19YB8	5/18/10	0.195	U	0.398	0.528		0.149	0.638		0.365	-0.026	U	0.303	4.84	J	2.66
SZ-3	J19YC0	5/18/10	0.045	U	0.401	0.655		0.123	0.549		0.276	0.0010	U	0.277	3.97	J	2.63
SZ-4	J19YC1	5/18/10	0.185	U	0.385	0.647		0.091	0.877		0.328	-0.096	U	0.296	4.01	J	2.53
SZ-5	J19YC2	5/18/10	0.082	U	0.404	0.654		0.209	0.462		0.452	0.028	U	0.257	3.72	J	2.63
SZ-6	J19YC3	5/18/10	0.115	U	0.377	0.662		0.085	0.684		0.242	-0.036	U	0.264	4.70	J	2.78
SZ-7	J19YC4	5/18/10	0.069	U	0.363	0.546		0.087	0.664		0.272	0.012	U	0.281	5.90	J	2.59
SZ-8	J19YC5	5/18/10	0.125	U	0.389	0.63		0.107	0.898		0.209	2.4		0.242	0.994	J	2.73
SZ-9	J19YC6	5/18/10	0.133	U	0.414	0.642		0.100	0.461		0.377	-0.065	U	0.309	3.19	J	2.62
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.283	U	0.639							-0.0679	U	0.174	0.0527		0.0245
SZ-10	J19YC7	5/18/10	0.029	U	0.387	0.49		0.071	0.424		0.255	-0.077	U	0.251	3.75	J	2.64
SZ-11	J19YC8	5/18/10	-0.091	U	0.37	0.73		0.055	0.868		0.17	0.113	U	0.235	0.097	U	2.99
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.467	U	0.644							-0.0415	U	0.193	0.0530		0.0137
SZ-12	J19YC9	5/18/10	-0.021	U	0.394	0.499		0.025	0.598		0.102	-0.0050	U	0.252	-0.774	U	2.97
DZ-1	J19YD1	5/18/10	0.13	U	0.382	0.668		0.086	0.800		0.302	-0.051	U	0.226	4.53	J	2.71
Duplicate of J19YD1	J19YF3	5/18/10	-0.086	U	0.39	0.731		0.086	0.539		0.333	-0.084	U	0.217	0.202	U	3.10
DZ-2	J19YD2	5/18/10	0.175	U	0.434	0.505		0.105	0.349		0.338	-0.060	U	0.291	2.13	UJ	2.60
DZ-3	J19YD3	5/18/10	0.289	U	0.424	0.876		0.163	0.739		0.232	0.194	U	0.326	1.79	UJ	2.58
DZ-4	J19YD4	5/18/10	0.166	U	0.375	0.586		0.147	0.654		0.349	0.059	U	0.257	2.55	UJ	2.64
DZ-5	J19YD5	5/18/10	0.146	U	0.492	0.586		0.087	0.828		0.258	0.071	U	0.311	1.72	UJ	2.76
DZ-6	J19YD6	5/18/10	0.194	U	0.384	0.544		0.091	0.571		0.314	0.051	U	0.244	2.32	UJ	2.55
DZ-7	J19YD7	5/18/10	0.114	U	0.37	0.613		0.090	0.402		0.364	-0.065	U	0.285	4.34	J	2.59
DZ-8	J19YD8	5/18/10	0.227	U	0.442	0.691		0.088	0.434		0.393	0.012	U	0.266	1.06	UJ	2.65
DZ-9	J19YD9	5/18/10	0.15	U	0.387	0.557		0.147	0.980		0.438	-0.110	U	0.324	1.91	UJ	2.62
DZ-10	J19YF0	5/18/10	-0.013	U	0.408	0.607		0.075	0.551		0.293	-0.053	U	0.272	2.53	J	2.53
DZ-11	J19YF1	5/18/10	-0.029	U	0.385	0.750		0.126	0.641		0.239	-0.020	U	0.228	1.06	U	2.96
DZ-12	J19YF2	5/18/10	0.012	U	0.400	0.615		0.175	0.373	U	0.377	0.0060	U	0.207	0.297	U	3.03

Attachment	1	Sheet No.	22 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Uranium-233/234			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	pCi/g	Q	MDA
SZ-2	J19YB9	5/18/10	0.77		0.226	0	U	0.274	0.439	U	0.439	0.681		0.226	8.59	U	8.59
Duplicate of J19YB9	J19YD0	5/18/10	0.930		0.178	0.084	U	0.215	0.405	U	0.405	0.768		0.178	9.41	U	9.41
SZ-1	J19YB8	5/18/10	0.266		0.157	0.050	U	0.190	0.435	U	0.435	0.225		0.157	11.2	U	11.2
SZ-3	J19YC0	5/18/10	0.395		0.233	0	U	0.282	0.301	U	0.301	0.426		0.233	7.38	U	7.38
SZ-4	J19YC1	5/18/10	0.326		0.226	0.036	U	0.274	0.388	U	0.388	0.444		0.226	10.4	U	10.4
SZ-5	J19YC2	5/18/10	0.811		0.222	0.035	U	0.268	0.538	U	0.538	0.753		0.222	14.2	U	14.2
SZ-6	J19YC3	5/18/10	0.739		0.202	0.064	U	0.244	0.378	U	0.378	0.739		0.202	7.18	U	7.18
SZ-7	J19YC4	5/18/10	0.594		0.216	0	U	0.262	0.335	U	0.335	0.678		0.216	7.21	U	7.21
SZ-8	J19YC5	5/18/10	0.724		0.213	0	U	0.258	0.423	U	0.423	0.669		0.213	10.0	U	10.0
SZ-9	J19YC6	5/18/10	0.575		0.259	0.041	U	0.314	0.380	U	0.380	0.542		0.259	10.4	U	10.4
SZ-9 re-sample 1[a]	J1FKL4	3/16/11	0.0792	U	0.114	-0.00137	U	0.102				0.214		0.123			
SZ-10	J19YC7	5/18/10	0.609		0.245	0.039	U	0.297	0.244	U	0.244	0.833		0.245	6.37	U	6.37
SZ-11	J19YC8	5/18/10	0.688		0.176	0.028	U	0.213	0.200	U	0.200	0.551		0.176	4.10	U	4.10
SZ-11 re-sample 1[a]	J1FKL5	3/16/11	0.196		0.123	-0.00163	U	0.123				0.454		0.137			
SZ-12	J19YC9	5/18/10	0.552		0.156	0.025	U	0.189	0.106	U	0.106	0.368		0.156	2.31	U	2.31
DZ-1	J19YD1	5/18/10	0.766		0.279	0	U	0.338	0.336	U	0.336	0.620		0.279	7.78	U	7.78
Duplicate of J19YD1	J19YF3	5/18/10	0.567		0.181	0	U	0.219	0.372	U	0.372	0.543		0.181	9.63	U	9.63
DZ-2	J19YD2	5/18/10	0.318		0.244	0	U	0.295	0.420	U	0.420	0.510		0.244	10.0	U	10.0
DZ-3	J19YD3	5/18/10	0.380		0.242	0	U	0.293	0.467	U	0.467	0.570		0.242	11.8	U	11.8
DZ-4	J19YD4	5/18/10	0.395		0.202	0.064	U	0.244	0.391	U	0.391	0.501		0.202	11.1	U	11.1
DZ-5	J19YD5	5/18/10	0.870		0.215	0.136	U	0.26	0.355	U	0.355	0.533		0.215	7.77	U	7.77
DZ-6	J19YD6	5/18/10	0.702		0.244	0.039	U	0.296	0.340	U	0.340	0.766		0.244	9.78	U	9.78
DZ-7	J19YD7	5/18/10	0.648		0.236	0	U	0.286	0.432	U	0.432	0.833		0.236	9.63	U	9.63
DZ-8	J19YD8	5/18/10	0.430		0.206	0.033	U	0.249	0.340	U	0.340	0.349		0.206	10.5	U	10.5
DZ-9	J19YD9	5/18/10	0.709		0.209	0.066	U	0.253	0.598	U	0.598	0.546		0.209	12.7	U	12.7
DZ-10	J19YF0	5/18/10	0.594		0.182	0	U	0.22	0.326	U	0.326	0.570		0.182	6.66	U	6.66
DZ-11	J19YF1	5/18/10	0.371		0.149	0	U	0.181	0.371	U	0.371	0.488		0.149	7.59	U	7.59
DZ-12	J19YF2	5/18/10	0.553		0.184	0	U	0.223	0.390	U	0.390	0.481		0.184	9.86	U	9.86

Attachment	1	Sheet No.	23 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Americium-241 GEA			Barium-133			Carbon-14			Cesium-137			Cobalt-60		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB-5	J19YF8	5/13/10	0.322	U	0.322	0.088	U	0.088	0.663	U	0.866	0.076	U	0.076	0.086	U	0.086
Duplicate of J19YF8	J19YH6	5/13/10	0.092	U	0.092	0.076	U	0.076	0.91	U	0.933	0.076	U	0.076	0.086	U	0.086
OB-1	J19YF4	5/13/10	0.088	U	0.088	0.08	U	0.08	0.576	U	0.674	0.078	U	0.078	0.082	U	0.082
OB-2	J19YF5	5/13/10	0.189	U	0.189	0.088	U	0.088	0.872	U	0.968	0.062	U	0.062	0.063	U	0.063
OB-3	J19YF6	5/13/10	0.155	U	0.155	0.065	U	0.065	0.145	U	0.982	0.057	U	0.057	0.045	U	0.045
OB-4	J19YF7	5/13/10	0.115	U	0.115	0.115	U	0.115	1.54		0.92	0.107	U	0.107	0.098	U	0.098
OB-6	J19YF9	5/13/10	0.084	U	0.084	0.084	U	0.084	1.24		0.89	0.076	U	0.076	0.077	U	0.077
OB-7	J19YH0	5/13/10	0.080	U	0.080	0.065	U	0.065	1.24		0.917	0.064	U	0.064	0.063	U	0.063
OB-8 re-sample 1[a]	J1FKL6	3/17/11	0.00932	U	0.0535	0.0144	U	0.0345	-0.0486	U	0.451	-0.00478	U	0.0298	0.0183	U	0.0346
OB-9	J19YH2	5/13/10	0.327	U	0.327	0.096	U	0.096	1.49		0.882	0.068	U	0.068	0.059	U	0.059
OB-10	J19YH3	5/13/10	0.169	U	0.169	0.08	U	0.08	1.02		0.904	0.066	U	0.066	0.063	U	0.063
OB-11	J19YH4	5/13/10	0.144	U	0.144	0.066	U	0.066	0.261	U	0.882	0.07	U	0.07	0.064	U	0.064
OB-12	J19YH5	5/13/10	0.11	U	0.11	0.11	U	0.11	0.43	U	0.943	0.108	U	0.108	0.1	U	0.1
OB-13	J1B4H9	5/17/10	0.064	U	0.064	0.032	U	0.032	0.051	U	0.513	0.036	U	0.036	0.02	U	0.02
OB-14	J1B4J0	5/17/10	0.066	U	0.066	0.059	U	0.059	0.063	U	0.511	0.056	U	0.056	0.063	U	0.063
OB-15	J1B4J1	5/17/10	0.124	U	0.124	0.064	U	0.064	-0.251	U	0.526	0.051	U	0.051	0.044	U	0.044
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	-0.039	U	0.0841	-0.00873	U	0.0854	-0.111	U	0.451	-0.0328	U	0.080	0.0179	U	0.0926
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	-0.0217	U	0.060	0.00758	U	0.060	0.101	U	0.449	0.0326	U	0.0608	0.00354	U	0.0733
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	-0.0570	U	0.147	0.000485	U	0.0237	-0.147	U	0.450	0.0180	U	0.0258	0.00260	U	0.0277
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	-0.0572	U	0.102	-0.00127	U	0.0358	0.0345	U	0.450	-0.00760	U	0.0341	0.00647	U	0.0366
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.0308	U	0.119	0.0276	U	0.0339	0.0399	U	0.450	-0.00482	U	0.0262	-0.000687	U	0.0246
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	-0.0244	U	0.183	-0.0036	U	0.0841	-0.0225	U	0.448	0.0528	U	0.0969	-0.0159	U	0.0789
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	-0.0974	U	0.221	0.0144	U	0.0420	0.0136	U	0.450	0.0515	U	0.0571	0.00491	U	0.0475
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.00323	U	0.126	0.0253	U	0.0356	0.298	U	0.450	0.0679		0.0285	-0.000156	U	0.0269
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	-0.000684	U	0.0531	-0.00388	U	0.0345	0.247	U	0.449	-0.00511	U	0.0279	-0.00386	U	0.0301
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	-0.0178	U	0.152	0.00169	U	0.0388	0.013	U	0.451	-0.0167	U	0.0322	-0.00777	U	0.0309
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	-0.00934	U	0.106	-0.00819	U	0.0342	0.0793	U	0.451	-0.00722	U	0.0312	-0.00823	U	0.0323
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.0161	U	0.0633	-0.00795	U	0.0377	0.0241	U	0.450	-0.0125	U	0.0343	0.00316	U	0.0340
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	-0.0546	U	0.143	0.0104	U	0.0242	0.0821	U	0.452	0.0167	U	0.0248	-0.0123	U	0.0232

Attachment	1	Sheet No.	24 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Europium-152			Europium-154			Europium-155			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB-5	J19YF8	5/13/10	0.175	U	0.175	0.305	U	0.305	0.185	U	0.185	-0.447	U	3.29	-0.056	U	0.269
Duplicate of J19YF8	J19YH6	5/13/10	0.198	U	0.198	0.262	U	0.262	0.151	U	0.151	0.122	U	3.28	0.03	U	0.23
OB-1	J19YF4	5/13/10	0.160	U	0.160	0.256	U	0.256	0.154	U	0.154	-0.475	U	3.49	0.024	U	0.227
OB-2	J19YF5	5/13/10	0.177	U	0.177	0.212	U	0.212	0.168	U	0.168	-0.354	U	3.58	0.267		0.227
OB-3	J19YF6	5/13/10	0.170	U	0.170	0.231	U	0.231	0.138	U	0.138	1.22	U	3.41	-0.056	U	0.267
OB-4	J19YF7	5/13/10	0.260	U	0.260	0.314	U	0.314	0.220	U	0.220	0.342	U	3.46	0	U	0.332
OB-6	J19YF9	5/13/10	0.160	U	0.160	0.245	U	0.245	0.155	U	0.155	-0.341	U	3.45	-0.058	U	0.322
OB-7	J19YH0	5/13/10	0.158	U	0.158	0.207	U	0.207	0.132	U	0.132	-0.419	U	3.39	0.023	U	0.224
OB-8 re-sample 1[a]	J1FKL6	3/17/11	0.0432	U	0.0774	-0.0353	U	0.0992	0.0820	U	0.0773	0.364	U	13.5	0.0395	U	0.148
OB-9	J19YH2	5/13/10	0.169	U	0.169	0.205	U	0.205	0.189	U	0.189	-0.121	U	3.27	1.46		0.298
OB-10	J19YH3	5/13/10	0.158	U	0.158	0.166	U	0.166	0.176	U	0.176	0.342	U	3.46	-0.024	U	0.180
OB-11	J19YH4	5/13/10	0.169	U	0.169	0.22	U	0.22	0.148	U	0.148	-0.36	U	3.24	-0.022	U	0.170
OB-12	J19YH5	5/13/10	0.242	U	0.242	0.301	U	0.301	0.201	U	0.201	-0.237	U	3.2	0	U	0.185
OB-13	J1B4H9	5/17/10	0.067	U	0.067	0.07	U	0.07	0.065	U	0.065	-0.185	U	2.8	0.037	U	0.282
OB-14	J1B4J0	5/17/10	0.132	U	0.132	0.170	U	0.170	0.120	U	0.120	1.61	U	3.12	-0.055	U	0.262
OB-15	J1B4J1	5/17/10	0.142	U	0.142	0.163	U	0.163	0.124	U	0.124	0.797	U	3.17	0	U	0.242
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.0133	U	0.19	0.0174	U	0.279	0.00650	U	0.139	2.88	U	13.7	-0.00601	U	0.144
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.0315	U	0.142	0.0430	U	0.216	0.0503	U	0.0970	1.71	U	13.6	0.0284	U	0.107
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	-0.00782	U	0.0570	0.00821	U	0.0841	0.0574	U	0.0674	1.47	U	12.8	0	U	0.131
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	-0.0164	U	0.0798	-0.0137	U	0.113	0.0727	U	0.0855	3.23	U	12.3	0.0523	U	0.196
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.0155	U	0.0745	-0.0515	U	0.0864	-0.00494	U	0.0883	-0.318	U	12.2	0	U	0.171
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.00384	U	0.198	0.0477	U	0.274	0.0990	U	0.163	0.313	U	13.3	-0.00196	U	0.147
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.0258	U	0.0974	0.00254	U	0.169	0.0255	U	0.0921	-1.31	U	12.3	-0.00155	U	0.116
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	-0.00760	U	0.0743	-0.00187	U	0.087	0.0387	U	0.0964	-1.96	U	13.5	0.0324	U	0.128
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.0126	U	0.0769	0.0108	U	0.099	0.0332	U	0.0751	0.329	U	14.0	-0.00471	U	0.141
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	-0.0923	U	0.0831	-0.0761	U	0.0927	0.00794	U	0.111	-2.08	U	11.9	-0.00179	U	0.133
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	-0.0122	U	0.0809	0.0410	U	0.109	-0.00152	U	0.0807	0.888	U	12.6	0	U	0.144
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	-0.0124	U	0.0931	0.00292	U	0.111	0.0284	U	0.0915	1.96	U	12.8	0	U	0.140
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	-0.0341	U	0.0532	-0.00577	U	0.0788	0.0495	U	0.0675	3.14	U	13.8	-0.00170	U	0.127

Attachment	1	Sheet No.	25 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Silver-108 metastable		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB-5	J19YF8	5/13/10	0.028	U	0.215	12.9		0.766	0.410		0.170	0.619		0.346	0.061	U	0.061
Duplicate of J19YF8	J19YH6	5/13/10	0.03	U	0.230	14.6		1.16	0.488		0.175	1.00		0.326	0.053	U	0.053
OB-1	J19YF4	5/13/10	0.047	U	0.181	12.3		0.865	0.392		0.135	0.681		0.222	0.060	U	0.060
OB-2	J19YF5	5/13/10	0	U	0.227	12.2		0.803	0.386		0.128	0.642		0.285	0.050	U	0.050
OB-3	J19YF6	5/13/10	-0.028	U	0.213	12.2		0.586	0.335		0.122	0.790		0.177	0.046	U	0.046
OB-4	J19YF7	5/13/10	-0.035	U	0.265	14.8		1.08	0.499		0.173	0.856		0.430	0.082	U	0.082
OB-6	J19YF9	5/13/10	0.058	U	0.223	13		0.704	0.444		0.124	0.902		0.282	0.056	U	0.056
OB-7	J19YH0	5/13/10	0	U	0.179	15.2		0.671	0.503		0.143	0.783		0.306	0.047	U	0.047
OB-8	J19YH1	5/13/10	0	U	0.201	11.4		0.642	0.430		0.107	0.673		0.285	0.043	U	0.043
OB-8 re-sample 1[a]	J1FKL6	3/17/11	-0.00397	U	0.165										-0.00434	U	0.0230
OB-9	J19YH2	5/13/10	0.027	U	0.206	12.7		0.689	0.388		0.143	0.472		0.308	0.053	U	0.053
OB-10	J19YH3	5/13/10	0	U	0.180	13.5		0.482	0.418		0.124	0.625		0.210	0.053	U	0.053
OB-11	J19YH4	5/13/10	0	U	0.170	13		0.662	0.505		0.106	1.08		0.210	0.048	U	0.048
OB-12	J19YH5	5/13/10	0	U	0.185	11.6		0.964	0.338		0.162	0.397	U	0.411	0.072	U	0.072
OB-13	J1B4H9	5/17/10	0	U	0.282	13.3		0.215	0.439		0.041	0.637		0.088	0.018	U	0.018
OB-14	J1B4J0	5/17/10	0	U	0.209	13.5		0.576	0.486		0.111	0.847		0.200	0.042	U	0.042
OB-15	J1B4J1	5/17/10	0.0	U	0.242	13		0.434	0.437		0.097	0.794		0.220	0.039	U	0.039
SPA-4	J19YJ0	5/17/10	0.108	U	0.277	12.4		0.709	0.390		0.116	0.557		0.282	0.051	U	0.051
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	-0.00300	U	0.125										0.0143	U	0.065
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0	U	0.107										0.0114	U	0.0461
SPA-1	J19YH7	5/17/10	0.028	U	0.215	12.7		0.574	0.404		0.095	0.608		0.231	0.046	U	0.046
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	-0.00176	U	0.131										0.00263	U	0.0175
SPA-2	J19YH8	5/17/10	0.033	U	0.255	14.8		1.08	0.505		0.239	0.818		0.451	0.080	U	0.080
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0	U	0.196										0.00455	U	0.0249
SPA-3	J19YH9	5/17/10	0.0	U	0.300	15.6		1.11	0.689		0.168	0.842		0.466	0.054	U	0.054
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0	U	0.171										-0.00180	U	0.0226
SPA-5	J19YJ1	5/17/10	0.0	U	0.373	12.3		0.885	0.565		0.109	1.03		0.280	0.053	U	0.053
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	-0.00196	U	0.147										-0.00601	U	0.0637
SPA-6	J19YJ2	5/17/10	0.032	U	0.248	12.3		1.09	0.494		0.205	1.05		0.518	0.092	U	0.092
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	-0.00155	U	0.116										0.00246	U	0.0294
SPA-7	J19YJ3	5/17/10	-0.041	U	0.316	15.6		0.834	0.395		0.138	0.775		0.256	0.047	U	0.047
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.0666	U	0.128										-0.00435	U	0.0228
SPA-8	J19YJ4	5/17/10	0	U	0.285	12.3		0.628	0.506		0.140	0.500		0.255	0.054	U	0.054
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.0282	U	0.131										-0.00839	U	0.0228
SPA-9	J19YJ5	5/17/10	0.037	U	0.283	11.8		0.881	0.370		0.159	0.736		0.363	0.056	U	0.056
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0	U	0.133										-0.000774	U	0.028
SPA-10	J19YJ6	5/17/10	0	U	0.302	14.1		1.07	0.832		0.213	1.06		0.474	0.082	U	0.082
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	-0.00384	U	0.160										0.00951	U	0.0267
SPA-11	J19YJ7	5/17/10	0	U	0.247	12.9		0.258	0.496		0.048	0.676		0.098	0.017	U	0.017
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0	U	0.140										0.00815	U	0.0306
SPA-12	J19YJ8	5/17/10	0	U	0.258	14.6		0.43	0.551		0.085	0.750		0.178	0.032	U	0.032
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	-0.00340	U	0.142										-0.00141	U	0.0169
Duplicate of J19YJ4	J19YJ9	5/17/10	0	U	0.267	15.7		0.301	0.567		0.057	0.829		0.137	0.019	U	0.019

Attachment	1	Sheet No.	26 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Technetium-99			Thorium-228 GEA			Thorium-232 GEA			Total beta radiostrontium			Tritium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB-5	J19YF8	5/13/10	0.003	U	0.383	0.706		0.118	0.619		0.346	-0.031	U	0.231	1.61	U	2.42
Duplicate of J19YF8	J19YH6	5/13/10	0.156	U	0.372	0.944		0.135	1.00		0.326	-0.1	U	0.259	1.88	U	2.6
OB-1	J19YF4	5/13/10	0.071	U	0.385	0.48		0.082	0.681		0.222	-0.046	U	0.204	0.746	U	2.51
OB-2	J19YF5	5/13/10	0.097	U	0.409	0.608		0.125	0.642		0.285	-0.094	U	0.224	2.93		2.68
OB-3	J19YF6	5/13/10	0.124	U	0.381	0.565		0.07	0.79		0.177	0.062	U	0.240	3.04		2.74
OB-4	J19YF7	5/13/10	0.125	U	0.396	0.651		0.224	0.856		0.43	0.01	U	0.214	3.61		2.67
OB-6	J19YF9	5/13/10	0.032	U	0.385	0.845		0.123	0.902		0.282	0.026	U	0.221	0.975	U	2.5
OB-7	J19YH0	5/13/10	0.214	U	0.37	0.644		0.078	0.783		0.306	0.089	U	0.249	2.78		2.59
OB-8	J19YH1	5/13/10	0.004	U	0.452	0.62		0.075	0.673		0.285	-0.051	U	0.291	3.09		2.68
OB-8 re-sample 1[a]	J1FKL6	3/17/11	-0.0128	U	0.642							0.0560	U	0.186	0.00188	U	0.0264
OB-9	J19YH2	5/13/10	0.124	U	0.390	0.651		0.11	0.472		0.308	-0.054	U	0.228	2.22	U	2.44
OB-10	J19YH3	5/13/10	0.005	U	0.380	0.586		0.126	0.625		0.210	-0.019	U	0.225	2.61		2.56
OB-11	J19YH4	5/13/10	0.029	U	0.363	0.738		0.091	1.08		0.210	0.089	U	0.261	0.916	U	2.47
OB-12	J19YH5	5/13/10	0.087	U	0.394	0.530		0.133	0.397	U	0.411	-0.028	U	0.241	0.68	U	2.62
OB-13	J1B4H9	5/17/10	0.087	U	0.443	0.565		0.034	0.637		0.088	-0.096	U	0.356	-0.998	U	7.04
OB-14	J1B4J0	5/17/10	0.082	U	0.419	0.598		0.071	0.847		0.200	-0.052	U	0.305	-1.09	U	7.68
OB-15	J1B4J1	5/17/10	0.059	U	0.443	0.646		0.069	0.794		0.220	-0.001	U	0.348	-2.07	U	7.28
SPA-4	J19YJ0	5/17/10	0.082	U	0.418	0.564		0.094	0.557		0.282	0.088	U	0.325	-1.24	U	7.16
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.165	U	0.607							0.0938	U	0.171	0.00250	U	0.0166
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.177	U	0.626							0.0251	U	0.170	-0.00206	U	0.0161
SPA-1	J19YH7	5/17/10	0.048	U	0.453	0.455		0.064	0.608		0.231	0.013	U	0.289	1.42	U	7.50
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.403	U	0.625							0.0850	U	0.171	0.000742	U	0.0166
SPA-2	J19YH8	5/17/10	0.130	U	0.462	0.525		0.217	0.818		0.451	0.007	U	0.313	-0.359	U	7.59
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0.288	U	0.624							0.0101	U	0.167	0.00638	U	0.0156
SPA-3	J19YH9	5/17/10	0.181	U	0.420	1.04		0.108	0.842		0.466	0.053	U	0.265	-2.56	U	7.38
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.520	U	0.617							0.0241	U	0.154	0.00375	U	0.0153
SPA-5	J19YJ1	5/17/10	0.086	U	0.399	0.927		0.137	1.03		0.280	-0.028	U	0.244	-2.27	U	8.46
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.397	U	0.621							0.0856	U	0.178	0.00266	U	0.0248
SPA-6	J19YJ2	5/17/10	0.195	U	0.428	0.687		0.134	1.05		0.518	-0.038	U	0.317	2.46	U	7.44
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.256	U	0.618							0.0207	U	0.173	0.0113	U	0.0278
SPA-7	J19YJ3	5/17/10	0.034	U	0.435	0.697		0.097	0.775		0.256	-0.067	U	0.314	-1.83	U	8.27
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.439	U	0.650							0.0345	U	0.170	0.0167	U	0.0237
SPA-8	J19YJ4	5/17/10	0.012	U	0.420	0.573		0.079	0.500		0.255	0.122	U	0.327	-0.83	U	7.52
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.485	U	0.615							0.0396	U	0.173	0.00300	U	0.0241
SPA-9	J19YJ5	5/17/10	0.086	U	0.417	0.693		0.098	0.736		0.363	0.033	U	0.290	1.25	U	8.79
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0.237	U	0.645							0.0531	U	0.173	0.00601	U	0.0336
SPA-10	J19YJ6	5/17/10	0.144	U	0.426	0.666		0.154	1.06		0.474	0.004	U	0.328	-1.06	U	7.45
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0.427	U	0.633							0.0381	U	0.166	0.00556	U	0.0140
SPA-11	J19YJ7	5/17/10	0.056	U	0.444	0.7		0.031	0.676		0.098	0.074	U	0.332	-1.64	U	7.42
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.575	U	0.615							0.110	U	0.167	0.00634	U	0.0126
SPA-12	J19YJ8	5/17/10	-0.015	U	0.430	0.756		0.057	0.75		0.178	0.049	U	0.364	-1.72	U	7.77
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.809		0.656							0.0884	U	0.172	0.00631	U	0.0206
Duplicate of J19YJ4	J19YJ9	5/17/10	0.028	U	0.404	0.831		0.036	0.829		0.137	0.013	U	0.296	0.457	U	7.26

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Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Uranium-233/234			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	pCi/g	Q	MDA
OB-5	J19YF8	5/13/10	0.517		0.172	0.027	U	0.208	0.351	U	0.351	0.427		0.172	12.3	U	12.3
Duplicate of J19YF8	J19YH6	5/13/10	0.579		0.201	0.032	U	0.244	0.432	U	0.432	0.526		0.201	8.91	U	8.91
OB-1	J19YF4	5/13/10	0.541		0.138	0.044	U	0.167	0.337	U	0.337	0.559		0.138	9.69	U	9.69
OB-2	J19YF5	5/13/10	0.494		0.169	0.064	U	0.163	0.425	U	0.425	0.459		0.135	7.07	U	7.07
OB-3	J19YF6	5/13/10	0.401		0.161	0.051	U	0.195	0.329	U	0.329	0.527		0.161	8.15	U	8.15
OB-4	J19YF7	5/13/10	0.598		0.148	0.047	U	0.179	0.626	U	0.626	0.444		0.148	11.9	U	11.9
OB-6	J19YF9	5/13/10	0.620		0.250	0.119	U	0.302	0.376	U	0.376	0.588		0.250	8.91	U	8.91
OB-7	J19YH0	5/13/10	0.558		0.194	0	U	0.235	0.295	U	0.295	0.660		0.194	7.88	U	7.88
OB-8	J19YH1	5/13/10	0.404		0.206	0.033	U	0.249	0.317	U	0.317	0.592		0.206	7.17	U	7.17
OB-8 re-sample 1[a]	J1FKL6	3/17/11	0.138	U	0.177	-0.0119	U	0.154				0.186	U	0.191			
OB-9	J19YH2	5/13/10	0.482		0.194	0.061	U	0.235	0.429	U	0.429	0.508		0.194	8.98	U	8.98
OB-10	J19YH3	5/13/10	0.632		0.186	0.029	U	0.225	0.39	U	0.39	0.292		0.186	7.69	U	7.69
OB-11	J19YH4	5/13/10	0.464		0.209	0.066	U	0.253	0.359	U	0.359	0.628		0.209	7.92	U	7.92
OB-12	J19YH5	5/13/10	0.760		0.224	0.035	U	0.271	0.490	U	0.490	0.731		0.224	11.6	U	11.6
OB-13	J1B4H9	5/17/10	0.495		0.223	0.035	U	0.270	0.144	U	0.144	0.524		0.223	2.6	U	2.6
OB-14	J1B4J0	5/17/10	0.778		0.161	0.051	U	0.195	0.284	U	0.284	0.421		0.161	5.59	U	5.59
OB-15	J1B4J1	5/17/10	-0.008	U	0.046	0.005	U	0.039	0.296	U	0.296	0.013	U	0.032	5.68	U	5.68
SPA-4	J19YJ0	5/17/10	0.366		0.280	0.133	U	0.339	0.370	U	0.370	0.44		0.28	7.81	U	7.81
SPA-4 re-sample 1[a]	J1FKM0	3/17/11	0.127		0.120	-0.00158	U	0.101				0.0772	U	0.101			
Duplicate of J1FKM0[a]	J1FKM9	3/17/11	0.0580	U	0.139	0.0162	U	0.122				0.236		0.163			
SPA-1	J19YH7	5/17/10	0.236		0.164	0.052	U	0.198	0.302	U	0.302	0.279		0.164	7.01	U	7.01
SPA-1 re-sample 1[a]	J1FKL7	3/17/11	0.218		0.142	-0.00464	U	0.111				0.174		0.135			
SPA-2	J19YH8	5/17/10	0.552		0.264	0	U	0.32	0.529	U	0.529	0.345		0.264	12.6	U	12.6
SPA-2 re-sample 1[a]	J1FKL8	3/17/11	0.043	U	0.105	0	U	0.0873				0.115		0.0873			
SPA-3	J19YH9	5/17/10	0.32		0.204	0.065	U	0.247	0.421	U	0.421	0.427		0.204	10.4	U	10.4
SPA-3 re-sample 1[a]	J1FKL9	3/17/11	0.162		0.0870	-0.00116	U	0.087				0.160		0.0970			
SPA-5	J19YJ1	5/17/10	0.488		0.208	0.033	U	0.251	0.359	U	0.359	0.38		0.208	8.44	U	8.44
SPA-5 re-sample 1[a]	J1FKM1	3/17/11	0.138		0.130	0.0551	U	0.109				0.0244	U	0.126			
SPA-6	J19YJ2	5/17/10	0.474		0.202	0.064	U	0.244	0.576	U	0.576	0.791		0.202	12.5	U	12.5
SPA-6 re-sample 1[a]	J1FKM2	3/17/11	0.141	U	0.154	-0.00773	U	0.135				0.132	U	0.180			
SPA-7	J19YJ3	5/17/10	1.01		0.257	0	U	0.312	0.373	U	0.373	0.774		0.257	8.73	U	8.73
SPA-7 re-sample 1[a]	J1FKM3	3/17/11	0.0757	U	0.147	-0.00560	U	0.134				0.130	U	0.153			
SPA-8	J19YJ4	5/17/10	0.85		0.21	0.033	U	0.254	0.413	U	0.413	0.302		0.21	8.54	U	8.54
SPA-8 re-sample 1[a]	J1FKM4	3/17/11	0.207		0.119	0	U	0.0988				0.183		0.0988			
SPA-9	J19YJ5	5/17/10	0.497		0.055	0.024	U	0.044	0.380	U	0.380	0.491		0.036	9.02	U	9.02
SPA-9 re-sample 1[a]	J1FKM5	3/17/11	0.453		0.106	0.0494	U	0.095				0.224		0.114			
SPA-10	J19YJ6	5/17/10	0.436		0.052	0.005	U	0.039	0.551	U	0.551	0.428		0.047	11.4	U	11.4
SPA-10 re-sample 1[a]	J1FKM6	3/17/11	0.187		0.100	-0.00133	U	0.1				0.211		0.112			
SPA-11	J19YJ7	5/17/10	0.496		0.158	0.05	U	0.191	0.145	U	0.145	0.393		0.158	2.76	U	2.76
SPA-11 re-sample 1[a]	J1FKM7	3/17/11	0.141		0.111	-0.00145	U	0.0931				0.0711	U	0.0931			
SPA-12	J19YJ8	5/17/10	0.692		0.165	0	U	0.2	0.203	U	0.203	0.346		0.165	4.64	U	4.64
SPA-12 re-sample 1[a]	J1FKM8	3/17/11	0.0717	U	0.178	0.0756	U	0.150				0.189		0.173			
Duplicate of J19YJ4	J19YJ9	5/17/10	0.33		0.194	0.031	U	0.235	0.148	U	0.148	0.635		0.194	4.79	U	4.79

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Americium-241 GEA			Barium-133			Carbon-14			Cesium-137			Cobalt-60		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-9	J19YC6	5/18/10	0.269	U	0.269	0.095	U	0.095	0.791	UJ	0.865	0.08	U	0.08	0.085	U	0.085
SZ-11	J19YC8	5/18/10	0.042	U	0.042	0.042	U	0.042	1.24		0.903	0.062	U	0.062	0.033	U	0.033
OB-8	J19YH1	5/13/10	0.149	U	0.149	0.053	U	0.053	0.472	U	0.982	0.063	U	0.063	0.058	U	0.058
SPA-4	J19YJ0	5/17/10	0.178	U	0.178	0.079	U	0.079	-0.029	U	0.489	0.100	U	0.1	0.057	U	0.057
SPA-1	J19YH7	5/17/10	0.124	U	0.124	0.054	U	0.054	-0.091	U	0.496	0.065	U	0.065	0.062	U	0.062
SPA-2	J19YH8	5/17/10	0.12	U	0.12	0.121	U	0.121	-0.085	U	0.534	0.253	U	0.253	0.112	U	0.112
SPA-3	J19YH9	5/17/10	0.107	U	0.107	0.083	U	0.083	0.136	U	0.51	0.234		0.092	0.094	U	0.094
SPA-5	J19YJ1	5/17/10	0.159	U	0.159	0.067	U	0.067	-0.014	U	0.525	0.110		0.077	0.078	U	0.078
SPA-6	J19YJ2	5/17/10	0.128	U	0.128	0.13	U	0.13	0.145	U	0.519	0.307		0.132	0.114	U	0.114
SPA-7	J19YJ3	5/17/10	0.085	U	0.085	0.067	U	0.067	-0.038	U	0.507	0.069	U	0.069	0.081	U	0.081
SPA-8	J19YJ4	5/17/10	0.321	U	0.321	0.098	U	0.098	0.039	U	0.51	0.118	U	0.118	0.067	U	0.067
SPA-9	J19YJ5	5/17/10	0.089	U	0.089	0.092	U	0.092	0.048	U	0.515	0.238		0.09	0.084	U	0.084
SPA-10	J19YJ6	5/17/10	0.115	U	0.115	0.116	U	0.116	0.141	U	0.502	0.333		0.119	0.092	U	0.092
SPA-11	J19YJ7	5/17/10	0.052	U	0.052	0.023	U	0.023	-0.003	U	0.522	0.056		0.028	0.025	U	0.025
SPA-12	J19YJ8	5/17/10	0.045	U	0.045	0.044	U	0.044	-0.046	U	0.503	0.089		0.048	0.039	U	0.039
Duplicate of J19YJ4	J19YJ9	5/17/10	0.035	U	0.035	0.026	U	0.026	-0.064	U	0.497	0.136		0.036	0.031	U	0.031

Attachment	1	Sheet No.	29 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Europium-152			Europium-154			Europium-155			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-9	J19YC6	5/18/10	0.214	U	0.214	0.299	U	0.299	0.187	U	0.187	-0.352	U	3.08	0	U	0.214
SZ-11	J19YC8	5/18/10	0.098	U	0.098	0.113	U	0.113	0.091	U	0.091	1.73	U	2.86	0	U	0.292
OB-8	J19YH1	5/13/10	0.141	U	0.141	0.195	U	0.195	0.137	U	0.137	-1.38	U	3.28	-0.053	U	0.29
SPA-4	J19YJ0	5/17/10	0.186	U	0.186	0.2	U	0.2	0.177	U	0.177	0.82	U	3.1	0	U	0.347
SPA-1	J19YH7	5/17/10	0.164	U	0.164	0.193	U	0.193	0.128	U	0.128	0.588	U	3.18	0.056	U	0.269
SPA-2	J19YH8	5/17/10	0.291	U	0.291	0.395	U	0.395	0.222	U	0.222	-0.083	U	3.15	0.033	U	0.256
SPA-3	J19YH9	5/17/10	0.255	U	0.255	0.298	U	0.298	0.169	U	0.169	1.58	U	3.42	-0.039	U	0.376
SPA-5	J19YJ1	5/17/10	0.204	U	0.204	0.25	U	0.25	0.164	U	0.164	1.2	U	3.02	0	U	0.373
SPA-6	J19YJ2	5/17/10	0.287	U	0.287	0.355	U	0.355	0.248	U	0.248	1.32	U	3.13	0	U	0.358
SPA-7	J19YJ3	5/17/10	0.197	U	0.197	0.253	U	0.253	0.146	U	0.146	1.08	U	3.14	0.124	U	0.396
SPA-8	J19YJ4	5/17/10	0.181	U	0.181	0.223	U	0.223	0.191	U	0.191	1.15	U	3.63	-0.075	U	0.357
SPA-9	J19YJ5	5/17/10	0.196	U	0.196	0.277	U	0.277	0.188	U	0.188	0.856	U	3.08	0.074	U	0.354
SPA-10	J19YJ6	5/17/10	0.272	U	0.272	0.325	U	0.325	0.251	U	0.251	1.6	U	3.11	-0.04	U	0.302
SPA-11	J19YJ7	5/17/10	0.064	U	0.064	0.085	U	0.085	0.054	U	0.054	0.732	U	3.08	-0.032	U	0.248
SPA-12	J19YJ8	5/17/10	0.104	U	0.104	0.128	U	0.128	0.084	U	0.084	0.22	U	3.33	0.034	U	0.258
Duplicate of J19YJ4	J19YJ9	5/17/10	0.073	U	0.073	0.089	U	0.089	0.057	U	0.057	1.23	U	3	0	U	0.268

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Silver-108 metastable		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-9	J19YC6	5/18/10	0	U	0.214	12.5		0.753	0.511		0.132	0.461		0.377	0.066	U	0.066
SZ-9 re-sample 1	J1FKL4	3/16/11	-0.00291	U	0.121										0.00194	U	0.0178
SZ-11	J19YC8	5/18/10	0	U	0.234	15.6		0.392	0.684		0.08	0.868		0.17	0.029	U	0.029
SZ-11 re-sample 1	J1FKL5	3/16/11	-0.00166	U	0.125										-0.0059	U	0.0213
OB-8	J19YH1	5/13/10	0	U	0.201	11.4		0.642	0.43		0.107	0.673		0.285	0.043	U	0.043
OB-8 re-sample 1	J1FKL6	3/17/11	-0.00397	U	0.165										-0.00434	U	0.023
SPA-4	J19YJ0	5/17/10	0.108	U	0.277	12.4		0.709	0.390		0.116	0.557		0.282	0.051	U	0.051
SPA-4 re-sample 1	J1FKM0	3/17/11	-0.00300	U	0.125										0.0143	U	0.065
Duplicate of J1FKM0	J1FKM9	3/17/11	0	U	0.107										0.0114	U	0.0461
SPA-1	J19YH7	5/17/10	0.028	U	0.215	12.7		0.574	0.404		0.095	0.608		0.231	0.046	U	0.046
SPA-1 re-sample 1	J1FKL7	3/17/11	-0.00176	U	0.131										0.00263	U	0.0175
SPA-2	J19YH8	5/17/10	0.033	U	0.255	14.8		1.08	0.505		0.239	0.818		0.451	0.080	U	0.080
SPA-2 re-sample 1	J1FKL8	3/17/11	0	U	0.196										0.00455	U	0.0249
SPA-3	J19YH9	5/17/10	-0.039	U	0.300	15.6		1.11	0.689		0.168	0.842		0.466	0.054	U	0.054
SPA-3 re-sample 1	J1FKL9	3/17/11	0	U	0.171										-0.0018	U	0.0226
SPA-5	J19YJ1	5/17/10	0.049	U	0.373	12.3		0.885	0.565		0.109	1.03		0.280	0.053	U	0.053
SPA-5 re-sample 1	J1FKM1	3/17/11	-0.00196	U	0.147										-0.00601	U	0.0637
SPA-6	J19YJ2	5/17/10	0.032	U	0.248	12.3		1.09	0.494		0.205	1.05		0.518	0.092	U	0.092
SPA-6 re-sample 1	J1FKM2	3/17/11	-0.00155	U	0.116										0.00246	U	0.0294
SPA-7	J19YJ3	5/17/10	-0.041	U	0.316	15.6		0.834	0.395		0.138	0.775		0.256	0.047	U	0.047
SPA-7 re-sample 1	J1FKM3	3/17/11	0.0666	U	0.128										-0.00435	U	0.0228
SPA-8	J19YJ4	5/17/10	0	U	0.285	12.3		0.628	0.506		0.140	0.500		0.255	0.054	U	0.054
SPA-8 re-sample 1	J1FKM4	3/17/11	0.0282	U	0.131										-0.00839	U	0.0228
SPA-9	J19YJ5	5/17/10	0.037	U	0.283	11.8		0.881	0.370		0.159	0.736		0.363	0.056	U	0.056
SPA-9 re-sample 1	J1FKM5	3/17/11	0	U	0.133										-0.000774	U	0.028
SPA-10	J19YJ6	5/17/10	0	U	0.302	14.1		1.07	0.832		0.213	1.06		0.474	0.082	U	0.082
SPA-10 re-sample 1	J1FKM6	3/17/11	-0.00384	U	0.160										0.00951	U	0.0267
SPA-11	J19YJ7	5/17/10	0	U	0.247	12.9		0.258	0.496		0.048	0.676		0.098	0.017	U	0.017
SPA-11 re-sample 1	J1FKM7	3/17/11	0	U	0.140										0.00815	U	0.0306
SPA-12	J19YJ8	5/17/10	0	U	0.258	14.6		0.43	0.551		0.085	0.750		0.178	0.032	U	0.032
SPA-12 re-sample 1	J1FKM8	3/17/11	-0.0034	U	0.142										-0.00141	U	0.0169
Duplicate of J19YJ4	J19YJ9	5/17/10	0	U	0.267	15.7		0.301	0.567		0.057	0.829		0.137	0.019	U	0.019

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Technetium-99			Thorium-228 GEA			Thorium-232 GEA			Total beta radiostrontium			Tritium		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ-9	J19YC6	5/18/10	0.133	U	0.414	0.642		0.1	0.461		0.377	-0.065	U	0.309	3.19	J	2.62
SZ-9 re-sample 1	J1FKL4	3/16/11	0.283	U	0.639							-0.0679	U	0.174	0.0527		0.0245
SZ-11	J19YC8	5/18/10	-0.091	U	0.37	0.73		0.055	0.868		0.17	0.113	U	0.235	0.097	U	2.99
SZ-11 re-sample 1	J1FKL5	3/16/11	0.467	U	0.644							-0.0415	U	0.193	0.0530		0.0137
OB-8	J19YH1	5/13/10	0.004	U	0.452	0.62		0.075	0.673		0.285	-0.051	U	0.291	3.09		2.68
OB-8 re-sample 1	J1FKL6	3/17/11	-0.0128	U	0.642							0.0560	U	0.186	0.00188	U	0.0264
SPA-4	J19YJ0	5/17/10	0.082	U	0.418	0.564		0.094	0.557		0.282	0.088	U	0.325	-1.24	U	7.16
SPA-4 re-sample 1	J1FKM0	3/17/11	0.165	U	0.607							0.0938	U	0.171	0.00250	U	0.0166
Duplicate of J1FKM0	J1FKM9	3/17/11	0.177	U	0.626							0.0251	U	0.170	-0.00206	U	0.0161
SPA-1	J19YH7	5/17/10	0.048	U	0.453	0.455		0.064	0.608		0.231	0.013	U	0.289	1.42	U	7.5
SPA-1 re-sample 1	J1FKL7	3/17/11	0.403	U	0.625							0.0850	U	0.171	0.000742	U	0.0166
SPA-2	J19YH8	5/17/10	0.130	U	0.462	0.525		0.217	0.818		0.451	0.007	U	0.313	-0.359	U	7.59
SPA-2 re-sample 1	J1FKL8	3/17/11	0.288	U	0.624							0.0101	U	0.167	0.00638	U	0.0156
SPA-3	J19YH9	5/17/10	0.181	U	0.420	1.04		0.108	0.842		0.466	0.053	U	0.265	-2.56	U	7.38
SPA-3 re-sample 1	J1FKL9	3/17/11	0.520	U	0.617							0.0241	U	0.154	0.00375	U	0.0153
SPA-5	J19YJ1	5/17/10	0.086	U	0.399	0.927		0.137	1.03		0.280	-0.028	U	0.244	-2.27	U	8.46
SPA-5 re-sample 1	J1FKM1	3/17/11	0.397	U	0.621							0.0856	U	0.178	0.00266	U	0.0248
SPA-6	J19YJ2	5/17/10	0.195	U	0.428	0.687		0.134	1.05		0.518	-0.038	U	0.317	2.46	U	7.44
SPA-6 re-sample 1	J1FKM2	3/17/11	0.256	U	0.618							0.0207	U	0.173	0.0113	U	0.0278
SPA-7	J19YJ3	5/17/10	0.034	U	0.435	0.697		0.097	0.775		0.256	-0.067	U	0.314	-1.83	U	8.27
SPA-7 re-sample 1	J1FKM3	3/17/11	0.439	U	0.65							0.0345	U	0.170	0.0167	U	0.0237
SPA-8	J19YJ4	5/17/10	0.012	U	0.420	0.573		0.079	0.500		0.255	0.122	U	0.327	-0.83	U	7.52
SPA-8 re-sample 1	J1FKM4	3/17/11	0.485	U	0.615							0.0396	U	0.173	0.00300	U	0.0241
SPA-9	J19YJ5	5/17/10	0.086	U	0.417	0.693		0.098	0.736		0.363	0.033	U	0.290	1.25	U	8.79
SPA-9 re-sample 1	J1FKM5	3/17/11	0.237	U	0.645							0.0531	U	0.173	0.00601	U	0.0336
SPA-10	J19YJ6	5/17/10	0.144	U	0.426	0.666		0.154	1.06		0.474	0.004	U	0.328	-1.06	U	7.45
SPA-10 re-sample 1	J1FKM6	3/17/11	0.427	U	0.633							0.0381	U	0.166	0.00556	U	0.0140
SPA-11	J19YJ7	5/17/10	0.056	U	0.444	0.7		0.031	0.676		0.098	0.074	U	0.332	-1.64	U	7.42
SPA-11 re-sample 1	J1FKM7	3/17/11	0.575	U	0.615							0.110	U	0.167	0.00634	U	0.0126
SPA-12	J19YJ8	5/17/10	-0.015	U	0.430	0.756		0.057	0.75		0.178	0.049	U	0.364	-1.72	U	7.77
SPA-12 re-sample 1	J1FKM8	3/17/11	0.809		0.656							0.0884	U	0.172	0.00631	U	0.0206
Duplicate of J19YJ4	J19YJ9	5/17/10	0.028	U	0.404	0.831		0.036	0.829		0.137	0.013	U	0.296	0.457	U	7.26

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results Replaced Data. For Information Only.

Sample Location	HEIS Number	Sample Date	Uranium-233/234			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	pCi/g	Q	MDA
SZ-9	J19YC6	5/18/10	0.575		0.259	0.041	U	0.314	0.380	U	0.380	0.542		0.259	10.4	U	10.4
SZ-9 re-sample 1	J1FKL4	3/16/11	0.0792	U	0.114	-0.00137	U	0.102				0.214		0.123			
SZ-11	J19YC8	5/18/10	0.688		0.176	0.028	U	0.213	0.200	U	0.200	0.551		0.176	4.10	U	4.10
SZ-11 re-sample 1	J1FKL5	3/16/11	0.196		0.123	-0.00163	U	0.123				0.454		0.137			
OB-8	J19YH1	5/13/10	0.404		0.206	0.033	U	0.249	0.317	U	0.317	0.592		0.206	7.17	U	7.17
OB-8 re-sample 1	J1FKL6	3/17/11	0.138	U	0.177	-0.0119	U	0.154				0.186	U	0.191			
SPA-4	J19YJ0	5/17/10	0.366		0.280	0.133	U	0.339	0.370	U	0.370	0.44		0.28	7.81	U	7.81
SPA-4 re-sample 1	J1FKM0	3/17/11	0.127		0.120	-0.00158	U	0.101				0.0772	U	0.101			
Duplicate of J1FKM0	J1FKM9	3/17/11	0.058	U	0.139	0.0162	U	0.122				0.236		0.163			
SPA-1	J19YH7	5/17/10	0.236		0.164	0.052	U	0.198	0.302	U	0.302	0.279		0.164	7.01	U	7.01
SPA-1 re-sample 1	J1FKL7	3/17/11	0.218		0.142	-0.00464	U	0.111				0.174		0.135			
SPA-2	J19YH8	5/17/10	0.552		0.264	0	U	0.32	0.529	U	0.529	0.345		0.264	12.6	U	12.6
SPA-2 re-sample 1	J1FKL8	3/17/11	0.043	U	0.105	0	U	0.0873				0.115		0.0873			
SPA-3	J19YH9	5/17/10	0.32		0.204	0.065	U	0.247	0.421	U	0.421	0.427		0.204	10.4	U	10.4
SPA-3 re-sample 1	J1FKL9	3/17/11	0.162		0.087	-0.00116	U	0.087				0.16		0.097			
SPA-5	J19YJ1	5/17/10	0.488		0.208	0.033	U	0.251	0.359	U	0.359	0.38		0.208	8.44	U	8.44
SPA-5 re-sample 1	J1FKM1	3/17/11	0.138		0.130	0.0551	U	0.109				0.0244	U	0.126			
SPA-6	J19YJ2	5/17/10	0.474		0.202	0.064	U	0.244	0.576	U	0.576	0.791		0.202	12.5	U	12.5
SPA-6 re-sample 1	J1FKM2	3/17/11	0.141	U	0.154	-0.00773	U	0.135				0.132	U	0.18			
SPA-7	J19YJ3	5/17/10	1.01		0.257	0	U	0.312	0.373	U	0.373	0.774		0.257	8.73	U	8.73
SPA-7 re-sample 1	J1FKM3	3/17/11	0.0757	U	0.147	-0.0056	U	0.134				0.13	U	0.153			
SPA-8	J19YJ4	5/17/10	0.85		0.21	0.033	U	0.254	0.413	U	0.413	0.302		0.21	8.54	U	8.54
SPA-8 re-sample 1	J1FKM4	3/17/11	0.207		0.119	0	U	0.0988				0.183		0.0988			
SPA-9	J19YJ5	5/17/10	0.497		0.055	0.024	U	0.044	0.380	U	0.380	0.491		0.036	9.02	U	9.02
SPA-9 re-sample 1	J1FKM5	3/17/11	0.453		0.106	0.0494	U	0.095				0.224		0.114			
SPA-10	J19YJ6	5/17/10	0.436		0.052	0.005	U	0.039	0.551	U	0.551	0.428		0.047	11.4	U	11.4
SPA-10 re-sample 1	J1FKM6	3/17/11	0.187		0.100	-0.00133	U	0.1				0.211		0.112			
SPA-11	J19YJ7	5/17/10	0.496		0.158	0.05	U	0.191	0.145	U	0.145	0.393		0.158	2.76	U	2.76
SPA-11 re-sample 1	J1FKM7	3/17/11	0.141		0.111	-0.00145	U	0.0931				0.0711	U	0.0931			
SPA-12	J19YJ8	5/17/10	0.692		0.165	0	U	0.2	0.203	U	0.203	0.346		0.165	4.64	U	4.64
SPA-12 re-sample 1	J1FKM8	3/17/11	0.0717	U	0.178	0.0756	U	0.15				0.189		0.173			
Duplicate of J19YJ4	J19YJ9	5/17/10	0.33		0.194	0.031	U	0.235	0.148	U	0.148	0.635		0.194	4.79	U	4.79

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SZ-2 - J19YB9			Duplicate of J19YB9 - J19YD0			SZ-1 - J19YB8			SZ-3 - J19YC0			SZ-4 - J19YC1		
		5/18/10			5/18/10			5/18/10			5/18/10			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	3.36	U	3.36	2.79	J	3.48
Acenaphthylene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	3.36	U	3.36	3.48	U	3.48
Anthracene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	3.36	U	3.36	3.48	U	3.48
Benzo(a)anthracene	PAH	3.87	U	3.87	0.858	J	3.43	1.05	J	3.51	4.71		3.36	7.32		3.48
Benzo(a)pyrene	PAH	3.87	U	3.87	1.20	J	3.43	3.51	U	3.51	5.05		3.36	6.97		3.48
Benzo(b)fluoranthene	PAH	1.16	J	3.87	1.54	J	3.43	0.878	J	3.51	6.73		3.36	11.3		3.48
Benzo(ghi)perylene	PAH	3.87	U	3.87	1.03	J	3.43	3.51	U	3.51	3.87		3.36	3.48	U	3.48
Benzo(k)fluoranthene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	2.52	J	3.36	3.49		3.48
Chrysene	PAH	3.87	U	3.87	3.43	U	3.43	1.05	J	3.51	5.38		3.36	8.37		3.48
Dibenz[a,h]anthracene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	3.36	U	3.36	2.62	J	3.48
Fluoranthene	PAH	3.87	U	3.87	2.57	J	3.43	2.46	J	3.51	21.4		3.36	19.9		3.48
Fluorene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	3.36	U	3.36	3.48	U	3.48
Indeno(1,2,3-cd)pyrene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	4.54		3.36	7.15		3.48
Naphthalene	PAH	3.87	U	3.87	3.43	U	3.43	3.51	U	3.51	15.0		3.36	3.48	U	3.48
Phenanthrene	PAH	1.16	J	3.87	1.2	J	3.43	1.58	J	3.51	7.57		3.36	5.93		3.48
Pyrene	PAH	3.87	U	3.87	3.43	U	3.43	1.23	J	3.51	14.5		3.36	17.3		3.48
Aroclor-1016	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1221	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1232	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1242	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1248	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1254	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	13.4	U	13.4	13.8	U	13.8
Aroclor-1260	PCB	14.6	U	14.6	13.7	U	13.7	13.8	U	13.8	3.85	J	13.4	13.8	U	13.8
Aldrin	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Alpha-BHC	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
alpha-Chlordane	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Beta-BHC	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Delta-BHC	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
4,4'-DDD	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
4,4'-DDE	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
4,4'-DDT	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Dieldrin	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endosulfan I	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endosulfan II	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endosulfan sulfate	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endrin	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endrin aldehyde	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Endrin ketone	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Gamma-BHC (Lindane)	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
gamma-Chlordane	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Heptachlor	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Heptachlor epoxide	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Methoxychlor	PEST	1.46	UD	1.46	1.37	UD	1.37	1.38	UD	1.38	1.34	UD	1.34	1.39	UD	1.39
Toxaphene	PEST	21.9	UJD	21.9	20.6	UD	20.6	20.7	UJD	20.7	20.1	UJD	20.1	20.8	UJD	20.8

Attachment	1	Sheet No.	34 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SZ-5 - J19YC2			SZ-6 - J19YC3			SZ-7 - J19YC4			SZ-8 - J19YC5			SZ-9 - J19YC6		
		5/18/10			5/18/10			5/18/10			5/18/10			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.52	U	3.52	3.45	U	3.45	3.49	U	3.49	3.46	U	3.46	3.51	U	3.51
Acenaphthylene	PAH	3.52	U	3.52	3.45	U	3.45	3.49	U	3.49	3.46	U	3.46	3.51	U	3.51
Anthracene	PAH	3.52	U	3.52	3.45	U	3.45	2.45	J	3.49	1.04	J	3.46	4.21		3.51
Benzo(a)anthracene	PAH	8.99		3.52	3.11	J	3.45	11.2		3.49	6.59		3.46	47.4		3.51
Benzo(a)pyrene	PAH	8.99		3.52	3.98		3.45	11.4		3.49	8.15		3.46	414		3.51
Benzo(b)fluoranthene	PAH	9.17		3.52	7.95		3.45	18.4		3.49	12		3.46	51.2		3.51
Benzo(ghi)perylene	PAH	6.52		3.52	3.63		3.45	10.1		3.49	9.36		3.46	24.7		3.51
Benzo(k)fluoranthene	PAH	3.88		3.52	1.73	J	3.45	5.77		3.49	3.99		3.46	16.5		3.51
Chrysene	PAH	11.5		3.52	2.94	J	3.45	16.4		3.49	4.68		3.46	70.9		3.51
Dibenz[a,h]anthracene	PAH	1.23	J	3.52	3.45	U	3.45	2.1	J	3.49	1.56	J	3.46	3.69		3.51
Fluoranthene	PAH	31.2		3.52	9.34		3.45	27.1		3.49	25		3.46	102		3.51
Fluorene	PAH	3.52	U	3.52	3.45	U	3.45	1.57	J	3.49	0.867	J	3.46	3.51	U	3.51
Indeno(1,2,3-cd)pyrene	PAH	6.7		3.52	5.01		3.45	9.97		3.49	8.32		3.46	3.51	U	3.51
Naphthalene	PAH	3.52	U	3.52	3.45	U	3.45	3.49	U	3.49	3.46	U	3.46	3.51	U	3.51
Phenanthrene	PAH	11.6		3.52	3.98		3.45	10.5		3.49	9.88		3.46	33.7		3.51
Pyrene	PAH	23.1		3.52	6.4		3.45	29.4		3.49	16.5		3.46	91.8		3.51
Aroclor-1016	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1221	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1232	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1242	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1248	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1254	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aroclor-1260	PCB	13.5	U	13.5	13.7	U	13.7	13.6	U	13.6	13.7	U	13.7	13.9	U	13.9
Aldrin	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Alpha-BHC	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
alpha-Chlordane	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Beta-BHC	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Delta-BHC	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
4,4'-DDD	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
4,4'-DDE	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.81	JD	1.81
4,4'-DDT	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	2.89	JD	2.89
Dieldrin	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endosulfan I	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endosulfan II	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endosulfan sulfate	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endrin	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endrin aldehyde	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Endrin ketone	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Gamma-BHC (Lindane)	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
gamma-Chlordane	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Heptachlor	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Heptachlor epoxide	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Methoxychlor	PEST	1.35	UD	1.35	1.37	UD	1.37	1.36	UD	1.36	1.37	UD	1.37	1.39	UD	1.39
Toxaphene	PEST	20.2	UJD	20.2	20.6	UJD	20.6	20.4	UJD	20.4	20.5	UJD	20.5	20.9	UD	20.9

Attachment	1	Sheet No.	35 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SZ-9 re-sample 1, J1FKL4			SZ-10 - J19YC7			SZ-11 - J19YC8			SZ-11 re-sample 1, J1FKL5			SZ-12 - J19YC9		
		3/16/11			5/18/10			5/18/10			3/16/11			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	11	U	11	3.43	U	3.43	17.1	U	17.1	10	U	10	3.4	U	3.4
Acenaphthylene	PAH	9.5	U	9.5	3.43	U	3.43	17.1	U	17.1	9.0	U	9.0	3.4	U	3.4
Anthracene	PAH	3.2	U	3.2	2.23	J	3.43	84.5	D	17.1	7.6	J	3.1	3.4	U	3.4
Benzo(a)anthracene	PAH	10	J	3.4	15.5		3.43	512	D	17.1	23		3.2	3.4	U	3.4
Benzo(a)pyrene	PAH	11	J	6.8	15.8		3.43	640	D	17.1	18		6.4	1.19	J	3.4
Benzo(b)fluoranthene	PAH	5.7	JX	4.4	24.9		3.43	549	D	17.1	20		4.2	1.19	J	3.4
Benzo(ghi)perylene	PAH	7.6	U	7.6	23.4		3.43	306	D	17.1	7.2	U	7.2	3.4	U	3.4
Benzo(k)fluoranthene	PAH	5.8	J	4.2	8.59		3.43	262	D	17.1	10	J	4.0	3.4	U	3.4
Chrysene	PAH	10	J	5.1	12.2		3.43	425	D	17.1	18	J	4.9	0.851	J	3.4
Dibenz[a,h]anthracene	PAH	12	U	12	2.75	J	3.43	82.6	D	17.1	11	U	11	3.4	U	3.4
Fluoranthene	PAH	14	U	14	38.5		3.43	1040	D	17.1	48		13	3.06	J	3.4
Fluorene	PAH	5.6	U	5.6	1.03	J	3.43	43.5	D	17.1	5.3	U	5.3	3.4	U	3.4
Indeno(1,2,3-cd)pyrene	PAH	13	U	13	16.8		3.43	17.1	U	17.1	14	J	12	3.4	U	3.4
Naphthalene	PAH	13	U	13	3.43	U	3.43	51.2	D	17.1	12	U	12	3.4	U	3.4
Phenanthrene	PAH	13	U	13	10.8		3.43	325	D	17.1	31	J	12	1.53	J	3.4
Pyrene	PAH	14	J	13	39.4		3.43	944	D	17.1	47		12	3.4	U	3.4
Aroclor-1016	PCB	2.9	U	2.9	13.5	U	13.5	13.8	U	13.8	2.8	U	2.8	13.7	U	13.7
Aroclor-1221	PCB	8.4	U	8.4	13.5	U	13.5	13.8	U	13.8	8.2	U	8.2	13.7	U	13.7
Aroclor-1232	PCB	2.1	U	2.1	13.5	U	13.5	13.8	U	13.8	2.0	U	2.0	13.7	U	13.7
Aroclor-1242	PCB	4.9	U	4.9	13.5	U	13.5	13.8	U	13.8	4.8	U	4.8	13.7	U	13.7
Aroclor-1248	PCB	4.9	U	4.9	13.5	U	13.5	13.8	U	13.8	4.8	U	4.8	13.7	U	13.7
Aroclor-1254	PCB	2.7	U	2.7	13.5	U	13.5	13.8	U	13.8	2.7	U	2.7	13.7	U	13.7
Aroclor-1260	PCB	2.7	U	2.7	13.5	U	13.5	13.8	U	13.8	2.7	U	2.7	13.7	U	13.7
Aldrin	PEST	0.26	U	0.26	1.36	UD	1.36	1.38	UD	1.38	0.26	U	0.26	1.37	UD	1.37
Alpha-BHC	PEST	0.23	U	0.23	1.36	UD	1.36	1.38	UD	1.38	0.22	U	0.22	1.37	UD	1.37
alpha-Chlordane	PEST	0.34	U	0.34	1.36	UD	1.36	1.38	UD	1.38	0.33	U	0.33	1.37	UD	1.37
Beta-BHC	PEST	0.70	U	0.70	1.36	UD	1.36	1.38	UD	1.38	0.67	U	0.67	1.37	UD	1.37
Delta-BHC	PEST	0.42	U	0.42	1.36	UD	1.36	1.38	UD	1.38	0.41	U	0.41	1.37	UD	1.37
4,4'-DDD	PEST	0.58	U	0.58	1.36	UD	1.36	2.18	JD	2.18	0.55	U	0.55	1.37	UD	1.37
4,4'-DDE	PEST	0.25	U	0.25	1.36	UD	1.36	6.29	D	6.29	0.45	J	0.24	1.37	UD	1.37
4,4'-DDT	PEST	0.62	U	0.62	1.36	UD	1.36	2.59	JD	2.59	0.60	U	0.60	1.37	UD	1.37
Dieldrin	PEST	0.22	U	0.22	1.36	UD	1.36	1.38	UD	1.38	0.21	U	0.21	1.37	UD	1.37
Endosulfan I	PEST	0.19	U	0.19	1.36	UD	1.36	1.38	UD	1.38	0.18	U	0.18	1.37	UD	1.37
Endosulfan II	PEST	0.30	U	0.30	1.36	UD	1.36	1.38	UD	1.38	0.29	U	0.29	1.37	UD	1.37
Endosulfan sulfate	PEST	0.29	U	0.29	1.36	UD	1.36	1.38	UD	1.38	0.28	U	0.28	1.37	UD	1.37
Endrin	PEST	0.32	U	0.32	1.36	UD	1.36	1.38	UD	1.38	0.31	U	0.31	1.37	UD	1.37
Endrin aldehyde	PEST	0.18	U	0.18	1.36	UD	1.36	1.38	UD	1.38	0.17	U	0.17	1.37	UD	1.37
Endrin ketone	PEST	0.52	U	0.52	1.36	UD	1.36	1.38	UD	1.38	0.50	U	0.50	1.37	UD	1.37
Gamma-BHC (Lindane)	PEST	0.49	U	0.49	1.36	UD	1.36	1.38	UD	1.38	0.47	U	0.47	1.37	UD	1.37
gamma-Chlordane	PEST	0.28	U	0.28	1.36	UD	1.36	1.38	UD	1.38	0.27	U	0.27	1.37	UD	1.37
Heptachlor	PEST	0.23	U	0.23	1.36	UD	1.36	1.38	UD	1.38	0.22	U	0.22	1.37	UD	1.37
Heptachlor epoxide	PEST	0.45	U	0.45	1.36	UD	1.36	1.38	UD	1.38	0.43	U	0.43	1.37	UD	1.37
Methoxychlor	PEST	0.47	U	0.47	1.36	UD	1.36	1.38	UD	1.38	0.46	U	0.46	1.37	UD	1.37
Toxaphene	PEST	17	U	17	20.4	UJD	20.4	20.7	UD	20.7	16	U	16	20.6	UD	20.6

Attachment	1	Sheet No.	36 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-1 - J19YD1			DZ-1 re-sample 1, J1FKK1			DZ-1 re-sample 2, J1HH80			DZ-2 - J19YD2			DZ-2 re-sample 1, J1FKK2		
		5/18/10			3/16/11			4/13/11			5/18/10			3/16/11		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10.1		3.48	10	U	10	11	U	11	3.51	U	3.51	11	U	11
Acenaphthylene	PAH	3.48	U	3.48	9.3	U	9.3	9.6	U	9.6	3.51	U	3.51	9.6	U	9.6
Anthracene	PAH	3.48	U	3.48	3.1	U	3.1	5.1	J	3.3	3.51	U	3.51	3.3	U	3.3
Benzo(a)anthracene	PAH	5.76		3.48	18		3.3	32		3.4	3.69		3.51	30		3.4
Benzo(a)pyrene	PAH	5.93		3.48	19		6.6	27		6.9	2.46	J	3.51	25		6.8
Benzo(b)fluoranthene	PAH	8.89		3.48	20		4.3	27		4.5	3.86		3.51	29		4.5
Benzo(ghi)perylene	PAH	5.23		3.48	7.4	U	7.4	16	J	7.7	2.28	J	3.51	7.7	U	7.7
Benzo(k)fluoranthene	PAH	2.79	J	3.48	8.6	J	4.1	13	J	4.2	1.41	J	3.51	16		4.2
Chrysene	PAH	9.42		3.48	17	J	5.0	26	J	5.2	5.62		3.51	27	J	5.2
Dibenz[a,h]anthracene	PAH	3.48	U	3.48	11	U	11	12	U	12	3.51	U	3.51	12	U	12
Fluoranthene	PAH	14.1		3.48	13	U	13	43		14	9.13		3.51	45		14
Fluorene	PAH	3.48	U	3.48	5.4	U	5.4	5.7	U	5.7	3.51	U	3.51	5.6	U	5.6
Indeno(1,2,3-cd)pyrene	PAH	3.48	U	3.48	15	J	12	19	J	13	2.28	J	3.51	20	J	13
Naphthalene	PAH	3.48	U	3.48	12	U	12	13	U	13	3.51	U	3.51	13	U	13
Phenanthrene	PAH	5.58		3.48	12	J	12	18	J	13	3.16	J	3.51	15	J	13
Pyrene	PAH	12.9		3.48	31	J	12	48		13	7.2		3.51	51		13
Aroclor-1016	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1221	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1232	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1242	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1248	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1254	PCB	13.7	U	13.7							13.1	U	13.1			
Aroclor-1260	PCB	13.7	U	13.7							13.1	U	13.1			
Aldrin	PEST	1.37	UD	1.37							1.31	UD	1.31			
Alpha-BHC	PEST	1.37	UD	1.37							1.31	UD	1.31			
alpha-Chlordane	PEST	1.37	UD	1.37							1.31	UD	1.31			
Beta-BHC	PEST	1.37	UD	1.37							1.31	UD	1.31			
Delta-BHC	PEST	1.37	UD	1.37							1.31	UD	1.31			
4,4'-DDD	PEST	1.37	UD	1.37							1.31	UD	1.31			
4,4'-DDE	PEST	1.37	UD	1.37							1.31	UD	1.31			
4,4'-DDT	PEST	1.37	UD	1.37							1.31	UD	1.31			
Dieldrin	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endosulfan I	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endosulfan II	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endosulfan sulfate	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endrin	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endrin aldehyde	PEST	1.37	UD	1.37							1.31	UD	1.31			
Endrin ketone	PEST	1.37	UD	1.37							1.31	UD	1.31			
Gamma-BHC (Lindane)	PEST	1.37	UD	1.37							1.31	UD	1.31			
gamma-Chlordane	PEST	1.37	UD	1.37							1.31	UD	1.31			
Heptachlor	PEST	1.37	UD	1.37							1.31	UD	1.31			
Heptachlor epoxide	PEST	1.37	UD	1.37							1.31	UD	1.31			
Methoxychlor	PEST	1.37	UD	1.37							1.31	UD	1.31			
Toxaphene	PEST	20.6	UJD	20.6							19.6	UJD	19.6			

Attachment	I	Sheet No.	37 of 79
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-2 re-sample 2, J1HH81			DZ-3 - J19YD3			DZ-3 re-sample 1, J1FKK3			DZ-3 re-sample 2, J1HH82			DZ-4 - J19YD4		
		4/13/11			5/18/10			3/16/11			4/13/11			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	3.56	U	3.56	12	U	12	9.9	U	9.9	6.88		3.52
Acenaphthylene	PAH	9.1	U	9.1	3.56	U	3.56	11	U	11	8.9	U	8.9	3.52	U	3.52
Anthracene	PAH	3.1	U	3.1	0.891	J	3.56	3.6	U	3.6	3.0	U	3.0	1.41	J	3.52
Benzo(a)anthracene	PAH	3.2	U	3.2	21.2		3.56	9.3	J	3.8	3.1	U	3.1	14.5		3.52
Benzo(a)pyrene	PAH	6.4	U	6.4	17.8		3.56	14	J	7.6	6.3	U	6.3	15.7		3.52
Benzo(b)fluoranthene	PAH	4.2	U	4.2	33.7		3.56	12	J	5.0	4.1	U	4.1	25.8		3.52
Benzo(ghi)perylene	PAH	7.2	U	7.2	13.9		3.56	8.5	U	8.5	7.1	U	7.1	13.2		3.52
Benzo(k)fluoranthene	PAH	4.0	U	4.0	11.4		3.56	5.6	J	4.7	3.9	U	3.9	8.82		3.52
Chrysene	PAH	4.9	U	4.9	21.6		3.56	12	J	5.7	4.8	U	4.8	35.1		3.52
Dibenz[a,h]anthracene	PAH	11	U	11	2.5	J	3.56	13	U	13	11	U	11	2.65	J	3.52
Fluoranthene	PAH	13	U	13	42.8		3.56	15	U	15	13	U	13	40		3.52
Fluorene	PAH	5.3	U	5.3	3.56	U	3.56	6.3	U	6.3	5.2	U	5.2	2.12	J	3.52
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	14.3		3.56	14	U	14	12	U	12	12.5		3.52
Naphthalene	PAH	12	U	12	3.56	U	3.56	14	U	14	12	U	12	3.52	U	3.52
Phenanthrene	PAH	12	U	12	6.77		3.56	14	U	14	12	U	12	9.17		3.52
Pyrene	PAH	12	U	12	46.7		3.56	18	J	14	12	U	12	34.2		3.52
Aroclor-1016	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1221	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1232	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1242	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1248	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1254	PCB				13.9	U	13.9							13.8	U	13.8
Aroclor-1260	PCB				7.31	J	13.9							13.8	U	13.8
Aldrin	PEST				1.39	UD	1.39							1.39	UD	1.39
Alpha-BHC	PEST				1.39	UD	1.39							1.39	UD	1.39
alpha-Chlordane	PEST				1.39	UD	1.39							1.39	UD	1.39
Beta-BHC	PEST				1.39	UD	1.39							1.39	UD	1.39
Delta-BHC	PEST				1.39	UD	1.39							1.39	UD	1.39
4,4'-DDD	PEST				2.12	JD	1.39							1.39	UD	1.39
4,4'-DDE	PEST				1.39	UD	1.39							1.39	UD	1.39
4,4'-DDT	PEST				3.1	JD	1.39							1.39	UD	1.39
Dieldrin	PEST				1.39	UD	1.39							1.39	UD	1.39
Endosulfan I	PEST				1.39	UD	1.39							1.39	UD	1.39
Endosulfan II	PEST				1.39	UD	1.39							1.39	UD	1.39
Endosulfan sulfate	PEST				1.39	UD	1.39							1.39	UD	1.39
Endrin	PEST				1.39	UD	1.39							1.39	UD	1.39
Endrin aldehyde	PEST				1.39	UD	1.39							1.39	UD	1.39
Endrin ketone	PEST				1.39	UD	1.39							1.39	UD	1.39
Gamma-BHC (Lindane)	PEST				1.39	UD	1.39							1.39	UD	1.39
gamma-Chlordane	PEST				1.39	UD	1.39							1.39	UD	1.39
Heptachlor	PEST				1.39	UD	1.39							1.39	UD	1.39
Heptachlor epoxide	PEST				1.39	UD	1.39							1.39	UD	1.39
Methoxychlor	PEST				1.39	UD	1.39							1.39	UD	1.39
Toxaphene	PEST				20.9	UJD	20.9							20.8	UJD	20.8

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-4 re-sample 1, J1FKK4			DZ-4 re-sample 2, J1HH83			DZ-5 - J19YD5			DZ-5 re-sample 1, J1FKK5			DZ-6 - J19YD6		
		3/16/11			4/13/11			5/18/10			3/16/11			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	10	U	10	5.98		3.52	10	U	10	3.51	U	3.51
Acenaphthylene	PAH	9.2	U	9.2	9.0	U	9.0	3.52	U	3.52	9.3	U	9.3	3.51	U	3.51
Anthracene	PAH	3.1	U	3.1	3.1	U	3.1	3.52	U	3.52	3.2	U	3.2	12.8		3.51
Benzo(a)anthracene	PAH	23	X	3.3	54		3.2	5.46		3.52	3.3	U	3.3	69.1		3.51
Benzo(a)pyrene	PAH	16		6.5	41		6.4	5.1		3.52	6.6	U	6.6	61.7		3.51
Benzo(b)fluoranthene	PAH	13	JX	4.3	51		4.2	6.51		3.52	4.3	U	4.3	88.4		3.51
Benzo(ghi)perylene	PAH	7.3	U	7.3	32		7.2	4.58		3.52	7.4	U	7.4	41.1		3.51
Benzo(k)fluoranthene	PAH	12	J	4.0	30		4.0	2.46	J	3.52	4.1	U	4.1	33.2		3.51
Chrysene	PAH	22	J	4.9	45		4.9	4.58		3.52	5.0	U	5.0	65		3.51
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	3.52	U	3.52	11	U	11	9.49		3.51
Fluoranthene	PAH	40	J	13	69		13	18		3.52	13	U	13	211		3.51
Fluorene	PAH	5.4	U	5.4	5.3	U	5.3	3.52	U	3.52	5.5	U	5.5	5.27		3.51
Indeno(1,2,3-cd)pyrene	PAH	13	J	12	35		12	3.34	J	3.52	12	U	12	46.1		3.51
Naphthalene	PAH	12	U	12	12	U	12	3.52	U	3.52	12	U	12	3.51	U	3.51
Phenanthrene	PAH	12	U	12	17	J	12	6.51		3.52	12	U	12	50.5		3.51
Pyrene	PAH	41		12	77		12	12.3		3.52	12	U	12	194		3.51
Aroclor-1016	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1221	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1232	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1242	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1248	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1254	PCB							13.3	U	13.3				13.9	U	13.9
Aroclor-1260	PCB							13.3	U	13.3				13.9	U	13.9
Aldrin	PEST							1.33	UD	1.33				1.4	UD	1.4
Alpha-BHC	PEST							1.33	UD	1.33				1.4	UD	1.4
alpha-Chlordane	PEST							1.33	UD	1.33				1.4	UD	1.4
Beta-BHC	PEST							1.33	UD	1.33				1.4	UD	1.4
Delta-BHC	PEST							1.33	UD	1.33				1.4	UD	1.4
4,4'-DDD	PEST							1.33	UD	1.33				1.4	UD	1.4
4,4'-DDE	PEST							1.33	UD	1.33				1.4	UD	1.4
4,4'-DDT	PEST							1.33	UD	1.33				1.4	UD	1.4
Dieldrin	PEST							1.33	UD	1.33				1.4	UD	1.4
Endosulfan I	PEST							1.33	UD	1.33				1.4	UD	1.4
Endosulfan II	PEST							1.33	UD	1.33				1.4	UD	1.4
Endosulfan sulfate	PEST							1.33	UD	1.33				1.4	UD	1.4
Endrin	PEST							1.33	UD	1.33				1.4	UD	1.4
Endrin aldehyde	PEST							1.33	UD	1.33				1.4	UD	1.4
Endrin ketone	PEST							1.33	UD	1.33				1.4	UD	1.4
Gamma-BHC (Lindane)	PEST							1.33	UD	1.33				1.4	UD	1.4
gamma-Chlordane	PEST							1.33	UD	1.33				1.4	UD	1.4
Heptachlor	PEST							1.33	UD	1.33				1.4	UD	1.4
Heptachlor epoxide	PEST							1.33	UD	1.33				1.4	UD	1.4
Methoxychlor	PEST							1.33	UD	1.33				1.4	UD	1.4
Toxaphene	PEST							20	UJD	20				21	UJD	21

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-6 re-sample 1, J1FKK6			DZ-7 - J19YD7			DZ-7 re-sample 1, J1FKK7			DZ-7 re-sample 2, J1HH84			DZ-8 - J19YD8		
		3/16/11			5/18/10			3/16/11			4/13/11			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	14.2	UD	14.2	11	U	11	11	U	11	37.1		3.54
Acenaphthylene	PAH	9.3	U	9.3	41.7	JD	14.2	9.7	U	9.7	10	U	10	3.54	U	3.54
Anthracene	PAH	3.1	U	3.1	16.1	JD	14.2	3.3	U	3.3	3.4	U	3.4	2.84	J	3.54
Benzo(a)anthracene	PAH	3.3	U	3.3	592	JD	14.2	23		3.4	3.6	U	3.6	22.3		3.54
Benzo(a)pyrene	PAH	6.6	U	6.6	533	JD	14.2	23		6.9	11	J	7.2	22.5		3.54
Benzo(b)fluoranthene	PAH	4.3	U	4.3	974	JD	14.2	19		4.5	8.2	J	4.7	32.4		3.54
Benzo(ghi)perylene	PAH	7.4	U	7.4	488	JD	14.2	7.7	U	7.7	8.1	U	8.1	19.5		3.54
Benzo(k)fluoranthene	PAH	4.1	U	4.1	350	JD	14.2	9.0	J	4.2	5.8	J	4.4	11.5		3.54
Chrysene	PAH	5.0	U	5.0	602	JD	14.2	21	J	5.2	8.6	J	5.4	27.7		3.54
Dibenz[a,h]anthracene	PAH	11	U	11	86.3	JD	14.2	12	U	12	12	U	12	3.72		3.54
Fluoranthene	PAH	13	U	13	1140	JD	14.2	14	U	14	15	U	15	47.3		3.54
Fluorene	PAH	5.4	U	5.4	14.2	UD	14.2	5.7	U	5.7	5.9	U	5.9	2.13	J	3.54
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	460	JD	14.2	18	J	13	13	U	13	18.1		3.54
Naphthalene	PAH	12	U	12	14.2	UD	14.2	13	U	13	13	U	13	3.54	U	3.54
Phenanthrene	PAH	12	U	12	79.1	JD	14.2	24	J	13	13	U	13	12.8		3.54
Pyrene	PAH	12	U	12	1360	JD	14.2	47	X	13	15	J	13	48.8		3.54
Aroclor-1016	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1221	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1232	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1242	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1248	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1254	PCB				13.8	UJ	13.8							14	U	14
Aroclor-1260	PCB				6.28	J	13.8							14	U	14
Aldrin	PEST				1.38	UD	1.38							1.4	UD	1.4
Alpha-BHC	PEST				1.38	UD	1.38							1.4	UD	1.4
alpha-Chlordane	PEST				1.38	UD	1.38							1.4	UD	1.4
Beta-BHC	PEST				1.38	UD	1.38							1.4	UD	1.4
Delta-BHC	PEST				1.38	UD	1.38							1.4	UD	1.4
4,4'-DDD	PEST				1.38	UD	1.38							1.4	UD	1.4
4,4'-DDE	PEST				1.38	UD	1.38							1.4	UD	1.4
4,4'-DDT	PEST				1.38	UD	1.38							1.4	UD	1.4
Dieldrin	PEST				1.38	UD	1.38							1.4	UD	1.4
Endosulfan I	PEST				1.38	UD	1.38							1.4	UD	1.4
Endosulfan II	PEST				1.38	UD	1.38							1.4	UD	1.4
Endosulfan sulfate	PEST				1.38	UD	1.38							1.4	UD	1.4
Endrin	PEST				1.38	UD	1.38							1.4	UD	1.4
Endrin aldehyde	PEST				1.38	UD	1.38							1.4	UD	1.4
Endrin ketone	PEST				1.38	UD	1.38							1.4	UD	1.4
Gamma-BHC (Lindane)	PEST				1.38	UD	1.38							1.4	UD	1.4
gamma-Chlordane	PEST				1.38	UD	1.38							1.4	UD	1.4
Heptachlor	PEST				1.38	UD	1.38							1.4	UD	1.4
Heptachlor epoxide	PEST				1.38	UD	1.38							1.4	UD	1.4
Methoxychlor	PEST				1.38	UD	1.38							1.4	UD	1.4
Toxaphene	PEST				20.7	UJD	20.7							21.1	UJD	21.1

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-8 re-sample 1, J1FKK8			DZ-8 re-sample 2, J1HH85			DZ-9 - J19YD9			DZ-9 re-sample 1, J1FKK9			DZ-10 - J19YF0		
		3/16/11			4/13/11			5/18/10			3/16/11			5/18/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	9.9	U	9.9	3.48	U	3.48	10	U	10	3.49	U	3.49
Acenaphthylene	PAH	9.4	U	9.4	8.9	U	8.9	3.48	U	3.48	9.0	U	9.0	3.49	U	3.49
Anthracene	PAH	3.2	U	3.2	3.0	U	3.0	3.83		3.48	3.0	U	3.0	1.75	J	3.49
Benzo(a)anthracene	PAH	3.3	U	3.3	3.2	U	3.2	16.7		3.48	3.2	U	3.2	14.1		3.49
Benzo(a)pyrene	PAH	6.7	U	6.7	6.4	U	6.4	14.3		3.48	6.4	U	6.4	14.3		3.49
Benzo(b)fluoranthene	PAH	4.4	U	4.4	4.2	U	4.2	19		3.48	4.2	U	4.2	19.6		3.49
Benzo(ghi)perylene	PAH	7.5	U	7.5	7.1	U	7.1	10.1		3.48	7.2	U	7.2	10.1		3.49
Benzo(k)fluoranthene	PAH	4.1	U	4.1	3.9	U	3.9	7.49		3.48	3.9	U	3.9	6.99		3.49
Chrysene	PAH	5.1	U	5.1	4.8	U	4.8	18.5		3.48	4.8	U	4.8	15.2		3.49
Dibenz[a,h]anthracene	PAH	12	U	12	11	U	11	2.26	J	3.48	11	U	11	2.27	J	3.49
Fluoranthene	PAH	14	U	14	13	U	13	6.09		3.48	13	U	13	39.8		3.49
Fluorene	PAH	5.5	U	5.5	5.2	U	5.2	1.57	J	3.48	5.3	U	5.3	1.22	J	3.49
Indeno(1,2,3-cd)pyrene	PAH	13	U	13	12	U	12	10.8		3.48	12	U	12	11		3.49
Naphthalene	PAH	13	U	13	12	U	12	3.48	U	3.48	12	U	12	3.49	U	3.49
Phenanthrene	PAH	13	U	13	12	U	12	14.1		3.48	12	U	12	1.75	J	3.49
Pyrene	PAH	13	U	13	12	U	12	42.8		3.48	12	U	12	36.2		3.49
Aroclor-1016	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1221	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1232	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1242	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1248	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1254	PCB							13.4	U	13.4				13.8	UJ	13.8
Aroclor-1260	PCB							13.4	U	13.4				13.8	UJ	13.8
Aldrin	PEST							1.34	UD	1.34				1.39	UD	1.39
Alpha-BHC	PEST							1.34	UD	1.34				1.39	UD	1.39
alpha-Chlordane	PEST							1.34	UD	1.34				1.39	UD	1.39
Beta-BHC	PEST							1.34	UD	1.34				1.39	UD	1.39
Delta-BHC	PEST							1.34	UD	1.34				1.39	UD	1.39
4,4'-DDD	PEST							1.34	UD	1.34				1.39	UD	1.39
4,4'-DDE	PEST							1.34	UD	1.34				1.39	UD	1.39
4,4'-DDT	PEST							1.34	UD	1.34				1.39	UD	1.39
Dieldrin	PEST							1.34	UD	1.34				1.39	UD	1.39
Endosulfan I	PEST							1.34	UD	1.34				1.39	UD	1.39
Endosulfan II	PEST							1.34	UD	1.34				1.39	UD	1.39
Endosulfan sulfate	PEST							1.34	UD	1.34				1.39	UD	1.39
Endrin	PEST							1.34	UD	1.34				1.39	UD	1.39
Endrin aldehyde	PEST							1.34	UD	1.34				1.39	UD	1.39
Endrin ketone	PEST							1.34	UD	1.34				1.39	UD	1.39
Gamma-BHC (Lindane)	PEST							1.34	UD	1.34				1.39	UD	1.39
gamma-Chlordane	PEST							1.34	UD	1.34				1.39	UD	1.39
Heptachlor	PEST							1.34	UD	1.34				1.39	UD	1.39
Heptachlor epoxide	PEST							1.34	UD	1.34				1.39	UD	1.39
Methoxychlor	PEST							1.34	UD	1.34				1.39	UD	1.39
Toxaphene	PEST							20.1	UJD	20.1				20.8	UJD	20.8

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-10 re-sample 1, J1FKL0			DZ-11 - J19YF1			DZ-11 re-sample 1, J1FKL1			DZ-12 - J19YF2			DZ-12 re-sample 1, J1FKL2		
		3/16/11			5/18/10			3/16/11			5/18/10			3/16/11		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	7.77		3.38	11	U	11	3.4	U	3.4	10	U	10
Acenaphthylene	PAH	9.1	U	9.1	3.38	U	3.38	9.8	U	9.8	3.4	U	3.4	9.1	U	9.1
Anthracene	PAH	3.1	U	3.1	9.29		3.38	3.3	U	3.3	15.2		3.4	3.1	U	3.1
Benzo(a)anthracene	PAH	3.2	U	3.2	48.7		3.38	3.5	U	3.5	94		3.4	3.2	U	3.2
Benzo(a)pyrene	PAH	6.4	U	6.4	68.9		3.38	7.0	U	7.0	142		3.4	6.5	U	6.5
Benzo(b)fluoranthene	PAH	4.2	U	4.2	69.1		3.38	4.6	U	4.6	107		3.4	4.2	U	4.2
Benzo(ghi)perylene	PAH	7.2	U	7.2	3.38	U	3.38	7.8	U	7.8	3.4	U	3.4	7.3	U	7.3
Benzo(k)fluoranthene	PAH	4.0	U	4.0	27.4		3.38	4.3	U	4.3	57.2		3.4	4.0	U	4.0
Chrysene	PAH	4.9	U	4.9	32.6		3.38	5.3	U	5.3	51.1		3.4	4.9	U	4.9
Dibenz[a,h]anthracene	PAH	11	U	11	3.38	U	3.38	12	U	12	3.4	U	3.4	11	U	11
Fluoranthene	PAH	13	U	13	112		3.38	14	U	14	177		3.4	13	U	13
Fluorene	PAH	5.3	U	5.3	5.41		3.38	5.7	U	5.7	8.01		3.4	5.3	U	5.3
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	3.38	U	3.38	13	U	13	3.4	U	3.4	12	U	12
Naphthalene	PAH	12	U	12	3.38	U	3.38	13	U	13	3.4	U	3.4	12	U	12
Phenanthrene	PAH	12	U	12	40.7		3.38	13	U	13	55.9		3.4	12	U	12
Pyrene	PAH	12	U	12	125		3.38	13	U	13	155		3.4	12	U	12
Aroclor-1016	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1221	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1232	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1242	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1248	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1254	PCB				14.1	U	14.1				13.7	U	13.7			
Aroclor-1260	PCB				14.1	U	14.1				13.7	U	13.7			
Aldrin	PEST				1.41	UD	1.41				1.37	UD	1.37			
Alpha-BHC	PEST				1.41	UD	1.41				1.37	UD	1.37			
alpha-Chlordane	PEST				1.41	UD	1.41				1.37	UD	1.37			
Beta-BHC	PEST				1.41	UD	1.41				1.37	UD	1.37			
Delta-BHC	PEST				1.41	UD	1.41				1.37	UD	1.37			
4,4'-DDD	PEST				1.41	UD	1.41				1.37	UD	1.37			
4,4'-DDE	PEST				1.41	UD	1.41				1.37	UD	1.37			
4,4'-DDT	PEST				1.41	UD	1.41				1.37	UD	1.37			
Dieldrin	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endosulfan I	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endosulfan II	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endosulfan sulfate	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endrin	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endrin aldehyde	PEST				1.41	UD	1.41				1.37	UD	1.37			
Endrin ketone	PEST				1.41	UD	1.41				1.37	UD	1.37			
Gamma-BHC (Lindane)	PEST				1.41	UD	1.41				1.37	UD	1.37			
gamma-Chlordane	PEST				1.41	UD	1.41				1.37	UD	1.37			
Heptachlor	PEST				1.41	UD	1.41				1.37	UD	1.37			
Heptachlor epoxide	PEST				1.41	UD	1.41				1.37	UD	1.37			
Methoxychlor	PEST				1.41	UD	1.41				1.37	UD	1.37			
Toxaphene	PEST				21.2	UD	21.2				20.6	UD	20.6			

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	Duplicate of J19YD1 - J19YF3			Duplicate of J1FKK8, J1FKL3			Duplicate of J1HH85 re-sample 2, J1HH86			Equipment Blank - J19YK0		
		5/18/10			3/16/11			4/13/11			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.33	U	3.33	11	U	11	10	U	10			
Acenaphthylene	PAH	3.33	U	3.33	9.6	U	9.6	9.2	U	9.2			
Anthracene	PAH	1.33	J	3.33	3.3	U	3.3	3.1	U	3.1			
Benzo(a)anthracene	PAH	18.3		3.33	3.4	U	3.4	3.2	U	3.2			
Benzo(a)pyrene	PAH	15.2		3.33	6.9	U	6.9	6.5	U	6.5			
Benzo(b)fluoranthene	PAH	12.2		3.33	4.5	U	4.5	4.3	U	4.3			
Benzo(ghi)perylene	PAH	8.33		3.33	7.7	U	7.7	7.3	U	7.3			
Benzo(k)fluoranthene	PAH	6		3.33	4.2	U	4.2	4.0	U	4.0			
Chrysene	PAH	26.3		3.33	5.2	U	5.2	4.9	U	4.9			
Dibenz[a,h]anthracene	PAH	1.17	J	3.33	12	U	12	11	U	11			
Fluoranthene	PAH	40.5		3.33	14	U	14	13	U	13			
Fluorene	PAH	1.17	J	3.33	5.7	U	5.7	5.4	U	5.4			
Indeno(1,2,3-cd)pyrene	PAH	9.33		3.33	13	U	13	12	U	12			
Naphthalene	PAH	3.33	U	3.33	13	U	13	12	U	12			
Phenanthrene	PAH	14.7		3.33	13	U	13	12	U	12			
Pyrene	PAH	36		3.33	13	U	13	12	U	12			
Aroclor-1016	PCB	13.8	U	13.8									
Aroclor-1221	PCB	13.8	U	13.8									
Aroclor-1232	PCB	13.8	U	13.8									
Aroclor-1242	PCB	13.8	U	13.8									
Aroclor-1248	PCB	13.8	U	13.8									
Aroclor-1254	PCB	13.8	U	13.8									
Aroclor-1260	PCB	13.8	U	13.8									
Aldrin	PEST	1.39	UD	1.39									
Alpha-BHC	PEST	1.39	UD	1.39									
alpha-Chlordane	PEST	1.39	UD	1.39									
Beta-BHC	PEST	1.39	UD	1.39									
Delta-BHC	PEST	1.39	UD	1.39									
4,4'-DDD	PEST	1.39	UD	1.39									
4,4'-DDE	PEST	1.39	UD	1.39									
4,4'-DDT	PEST	1.39	UD	1.39									
Dieldrin	PEST	1.39	UD	1.39									
Endosulfan I	PEST	1.39	UD	1.39									
Endosulfan II	PEST	1.39	UD	1.39									
Endosulfan sulfate	PEST	1.39	UD	1.39									
Endrin	PEST	1.39	UD	1.39									
Endrin aldehyde	PEST	1.39	UD	1.39									
Endrin ketone	PEST	1.39	UD	1.39									
Gamma-BHC (Lindane)	PEST	1.39	UD	1.39									
gamma-Chlordane	PEST	1.39	UD	1.39									
Heptachlor	PEST	1.39	UD	1.39									
Heptachlor epoxide	PEST	1.39	UD	1.39									
Methoxychlor	PEST	1.39	UD	1.39									
Toxaphene	PEST	20.8	UD	20.8									

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SZ-2 - J19YB9			Duplicate of J19YB9 - J19YD0			SZ-1 - J19YB8			SZ-3 - J19YC0			SZ-4 - J19YC1		
		5/18/10			5/18/10			5/18/10			5/18/10			5/18/10		
		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	380	UJ	380	340	U	340	347	UJ	347	329	UJ	329	344	UJ	344
1,2-Dichlorobenzene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
1,3-Dichlorobenzene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
1,4-Dichlorobenzene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2,4,5-Trichlorophenol	SVOA	380	UJ	380	340	U	340	347	UJ	347	329	UJ	329	344	UJ	344
2,4,6-Trichlorophenol	SVOA	380	UJ	380	340	U	340	347	UJ	347	329	UJ	329	344	UJ	344
2,4-Dichlorophenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2,4-Dimethylphenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2,4-Dinitrophenol	SVOA	1900	UJ	1900	1700	U	1700	1730	UJ	1730	1640	UJ	1640	1720	UJ	1720
2,4-Dinitrotoluene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2,6-Dinitrotoluene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2-Chloronaphthalene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2-Chlorophenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2-Methylnaphthalene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2-Methylphenol (cresol, o-)	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
2-Nitroaniline	SVOA	1900	U	1900	1700	U	1700	1730	U	1730	1640	U	1640	1720	U	1720
2-Nitrophenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
3,3'-Dichlorobenzidine	SVOA	760	U	760	679	U	679	694	U	694	658	U	658	688	U	688
3+4 Methylphenol (cresol, m+p)	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
3-Nitroaniline	SVOA	1900	U	1900	1700	U	1700	1730	U	1730	1640	U	1640	1720	U	1720
4,6-Dinitro-2-methylphenol	SVOA	380	UJ	380	340	U	340	347	UJ	347	329	UJ	329	344	UJ	344
4-Bromophenylphenyl ether	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
4-Chloro-3-methylphenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
4-Chloroaniline	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
4-Chlorophenylphenyl ether	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
4-Nitroaniline	SVOA	1900	U	1900	1700	U	1700	1730	U	1730	1640	U	1640	1720	U	1720
4-Nitrophenol	SVOA	1900	U	1900	1700	U	1700	1730	U	1730	1640	U	1640	1720	U	1720
Acenaphthene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Acenaphthylene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Anthracene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Benzo(a)anthracene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Benzo(a)pyrene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Benzo(b)fluoranthene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Benzo(ghi)perylene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Benzo(k)fluoranthene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Bis(2-chloro-1-methylethyl)ether	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Bis(2-Chloroethoxy)methane	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Bis(2-chloroethyl) ether	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Bis(2-ethylhexyl) phthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Butylbenzylphthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Carbazole	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Chrysene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Dibenz[a,h]anthracene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Dibenzofuran	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Diethyl phthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Dimethyl phthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Di-n-butylphthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Di-n-octylphthalate	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Fluoranthene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Fluorene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Hexachlorobenzene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Hexachlorobutadiene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Hexachlorocyclopentadiene	SVOA	380	UJ	380	340	U	340	347	UJ	347	329	UJ	329	344	UJ	344
Hexachloroethane	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Indeno(1,2,3-cd)pyrene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Isophorone	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Naphthalene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Nitrobenzene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
N-Nitroso-di-n-dipropylamine	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
N-Nitrosodiphenylamine	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Pentachlorophenol	SVOA	1900	UJ	1900	1700	U	1700	1730	UJ	1730	1640	UJ	1640	1720	UJ	1720
Phenanthrene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Phenol	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344
Pyrene	SVOA	380	U	380	340	U	340	347	U	347	329	U	329	344	U	344

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SZ-5 - J19YC2			SZ-6 - J19YC3			SZ-7 - J19YC4			SZ-8 - J19YC5			SZ-9 - J19YC6		
		5/18/10			5/18/10			5/18/10			5/18/10			5/18/10		
		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	349	UJ	349	341	UJ	341	345	UJ	345	335	UJ	335	686	U	686
1,2-Dichlorobenzene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
1,3-Dichlorobenzene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
1,4-Dichlorobenzene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2,4,5-Trichlorophenol	SVOA	349	UJ	349	341	UJ	341	345	UJ	345	335	UJ	335	686	U	686
2,4,6-Trichlorophenol	SVOA	349	UJ	349	341	UJ	341	345	UJ	345	335	UJ	335	686	U	686
2,4-Dichlorophenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2,4-Dimethylphenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2,4-Dinitrophenol	SVOA	1750	UJ	1750	1710	UJ	1710	1730	UJ	1730	1680	UJ	1680	3430	U	3430
2,4-Dinitrotoluene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2,6-Dinitrotoluene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2-Chloronaphthalene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2-Chlorophenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2-Methylnaphthalene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2-Methylphenol (cresol, o-)	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
2-Nitroaniline	SVOA	1750	U	1750	1710	U	1710	1730	U	1730	1680	U	1680	3430	U	3430
2-Nitrophenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
3,3'-Dichlorobenzidine	SVOA	699	U	699	682	U	682	691	U	691	671	U	671	1370	U	1370
3+4 Methylphenol (cresol, m+p)	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
3-Nitroaniline	SVOA	1750	U	1750	1710	U	1710	1730	U	1730	1680	U	1680	3430	U	3430
4,6-Dinitro-2-methylphenol	SVOA	349	UJ	349	341	UJ	341	345	UJ	345	335	UJ	335	686	U	686
4-Bromophenylphenyl ether	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
4-Chloro-3-methylphenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
4-Chloroaniline	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
4-Chlorophenylphenyl ether	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
4-Nitroaniline	SVOA	1750	U	1750	1710	U	1710	1730	U	1730	1680	U	1680	3430	U	3430
4-Nitrophenol	SVOA	1750	U	1750	1710	U	1710	1730	U	1730	1680	U	1680	3430	U	3430
Acenaphthene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Acenaphthylene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Anthracene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Benzo(a)anthracene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Benzo(a)pyrene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Benzo(b)fluoranthene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Benzo(ghi)perylene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Benzo(k)fluoranthene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Bis(2-chloro-1-methylethyl)ether	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Bis(2-Chloroethoxy)methane	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Bis(2-chloroethyl) ether	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Bis(2-ethylhexyl) phthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Butylbenzylphthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Carbazole	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Chrysene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Dibenz[a,h]anthracene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Dibenzofuran	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Diethyl phthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Dimethyl phthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Di-n-butylphthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Di-n-octylphthalate	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Fluoranthene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Fluorene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Hexachlorobenzene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Hexachlorobutadiene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Hexachlorocyclopentadiene	SVOA	349	UJ	349	341	UJ	341	345	UJ	345	335	UJ	335	686	U	686
Hexachloroethane	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Indeno(1,2,3-cd)pyrene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Isophorone	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Naphthalene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Nitrobenzene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
N-Nitroso-di-n-dipropylamine	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
N-Nitrosodiphenylamine	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Pentachlorophenol	SVOA	1750	UJ	1750	1710	UJ	1710	1730	UJ	1730	1680	UJ	1680	3430	U	3430
Phenanthrene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Phenol	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686
Pyrene	SVOA	349	U	349	341	U	341	345	U	345	335	U	335	686	U	686

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CONSTITUENT	CLASS	SZ-9 re-sample 1, J1FKL4			SZ-10 - J19YC7			SZ-11 - J19YC8			SZ-11 re-sample 1, J1FKL5			SZ-12 - J19YC9		
		3/16/11			5/18/10			5/18/10			3/16/11			5/18/10		
		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	30	U	30	337	UJ	337	342	U	342	28	U	28	340	U	340
1,2-Dichlorobenzene	SVOA	23	U	23	337	U	337	342	U	342	22	U	22	340	U	340
1,3-Dichlorobenzene	SVOA	13	U	13	337	U	337	342	U	342	12	U	12	340	U	340
1,4-Dichlorobenzene	SVOA	14	U	14	337	U	337	342	U	342	14	U	14	340	U	340
2,4,5-Trichlorophenol	SVOA	11	U	11	337	UJ	337	342	U	342	10	U	10	340	U	340
2,4,6-Trichlorophenol	SVOA	11	U	11	337	UJ	337	342	U	342	10	U	10	340	U	340
2,4-Dichlorophenol	SVOA	11	U	11	337	U	337	342	U	342	10	U	10	340	U	340
2,4-Dimethylphenol	SVOA	70	U	70	337	U	337	342	U	342	67	U	67	340	U	340
2,4-Dinitrophenol	SVOA	350	U	350	1690	UJ	1690	1710	U	1710	340	U	340	1700	U	1700
2,4-Dinitrotoluene	SVOA	70	U	70	337	U	337	342	U	342	67	U	67	340	U	340
2,6-Dinitrotoluene	SVOA	30	U	30	337	U	337	342	U	342	28	U	28	340	U	340
2-Chloronaphthalene	SVOA	11	U	11	337	U	337	342	U	342	10	U	10	340	U	340
2-Chlorophenol	SVOA	22	U	22	337	U	337	342	U	342	21	U	21	340	U	340
2-Methylnaphthalene	SVOA	20	U	20	337	U	337	342	U	342	19	U	19	340	U	340
2-Methylphenol (cresol, o-)	SVOA	14	U	14	337	U	337	342	U	342	13	U	13	340	U	340
2-Nitroaniline	SVOA	53	U	53	1690	U	1690	1710	U	1710	50	U	50	1700	U	1700
2-Nitrophenol	SVOA	11	U	11	337	U	337	342	U	342	10	U	10	340	U	340
3,3'-Dichlorobenzidine	SVOA	96	U	96	674	U	674	684	U	684	91	U	91	680	U	680
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	337	U	337	342	U	342	33	U	33	340	U	340
3-Nitroaniline	SVOA	78	U	78	1690	U	1690	1710	U	1710	74	U	74	1700	U	1700
4,6-Dinitro-2-methylphenol	SVOA	350	U	350	337	UJ	337	342	U	342	330	U	330	340	U	340
4-Bromophenylphenyl ether	SVOA	20	U	20	337	U	337	342	U	342	19	U	19	340	U	340
4-Chloro-3-methylphenol	SVOA	70	U	70	337	U	337	342	U	342	67	U	67	340	U	340
4-Chloroaniline	SVOA	87	U	87	337	U	337	342	U	342	83	U	83	340	U	340
4-Chlorophenylphenyl ether	SVOA	22	U	22	337	U	337	342	U	342	21	U	21	340	U	340
4-Nitroaniline	SVOA	77	U	77	1690	U	1690	1710	U	1710	73	U	73	1700	U	1700
4-Nitrophenol	SVOA	100	U	100	1690	U	1690	1710	U	1710	98	U	98	1700	U	1700
Acenaphthene	SVOA	11	U	11	337	U	337	342	U	342	10	U	10	340	U	340
Acenaphthylene	SVOA	18	U	18	337	U	337	342	U	342	17	U	17	340	U	340
Anthracene	SVOA	18	U	18	337	U	337	89	J	342	17	U	17	340	U	340
Benzo(a)anthracene	SVOA	21	U	21	337	U	337	605		342	20	U	20	340	U	340
Benzo(a)pyrene	SVOA	21	U	21	337	U	337	541		342	20	U	20	340	U	340
Benzo(b)fluoranthene	SVOA	28	U	28	337	U	337	523		342	26	U	26	340	U	340
Benzo(ghi)perylene	SVOA	17	U	17	337	U	337	350		342	16	U	16	340	U	340
Benzo(k)fluoranthene	SVOA	43	U	43	337	U	337	498		342	40	U	40	340	U	340
Bis(2-chloro-1-methylethyl)ether	SVOA	25	U	25	337	U	337	342	U	342	23	U	23	340	U	340
Bis(2-Chloroethoxy)methane	SVOA	25	U	25	337	U	337	342	U	342	23	U	23	340	U	340
Bis(2-chloroethyl) ether	SVOA	18	U	18	337	U	337	342	U	342	17	U	17	340	U	340
Bis(2-ethylhexyl) phthalate	SVOA	49	U	49	337	U	337	342	U	342	46	U	46	340	U	340
Butylbenzylphthalate	SVOA	46	U	46	337	U	337	342	U	342	43	U	43	340	U	340
Carbazole	SVOA	38	U	38	337	U	337	342	U	342	36	U	36	340	U	340
Chrysene	SVOA	29	U	29	337	U	337	609		342	27	U	27	340	U	340
Dibenz[a,h]anthracene	SVOA	20	U	20	337	U	337	127	J	342	19	U	19	340	U	340
Dibenzofuran	SVOA	21	U	21	337	U	337	342	U	342	20	U	20	340	U	340
Diethyl phthalate	SVOA	28	U	28	337	U	337	342	U	342	26	U	26	340	U	340
Dimethyl phthalate	SVOA	25	U	25	337	U	337	342	U	342	23	U	23	340	U	340
Di-n-butylphthalate	SVOA	31	U	31	337	U	337	342	U	342	29	U	29	340	U	340
Di-n-octylphthalate	SVOA	15	U	15	337	U	337	342	U	342	15	U	15	340	U	340
Fluoranthene	SVOA	38	U	38	337	U	337	1050		1050	36	U	36	340	U	340
Fluorene	SVOA	19	U	19	337	U	337	342	U	342	18	U	18	340	U	340
Hexachlorobenzene	SVOA	31	U	31	337	U	337	342	U	342	29	U	29	340	U	340
Hexachlorobutadiene	SVOA	11	U	11	337	U	337	342	U	342	10	U	10	340	U	340
Hexachlorocyclopentadiene	SVOA	53	U	53	337	UJ	337	342	U	342	50	U	50	340	U	340
Hexachloroethane	SVOA	23	U	23	337	U	337	342	U	342	22	U	22	340	U	340
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	337	U	337	347		342	22	U	22	340	U	340
Isophorone	SVOA	18	U	18	337	U	337	342	U	342	17	U	17	340	U	340
Naphthalene	SVOA	33	U	33	337	U	337	342	U	342	31	U	31	340	U	340
Nitrobenzene	SVOA	23	U	23	337	U	337	342	U	342	22	U	22	340	U	340
N-Nitroso-di-n-dipropylamine	SVOA	33	U	33	337	U	337	342	U	342	31	U	31	340	U	340
N-Nitrosodiphenylamine	SVOA	22	U	22	337	U	337	342	U	342	21	U	21	340	U	340
Pentachlorophenol	SVOA	350	U	350	1690	UJ	1690	1710	U	1710	330	U	330	1700	U	1700
Phenanthrene	SVOA	18	U	18	337	U	337	318	J	342	17	U	17	340	U	340
Phenol	SVOA	19	U	19	337	U	337	342	U	342	18	U	18	340	U	340
Pyrene	SVOA	22	J	13	337	U	337	921		342	12	U	12	340	U	340

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-1 - J19YD1			DZ-1 re-sample 1, J1FKK1			DZ-1 re-sample 2, J1HH80			DZ-2 - J19YD2			DZ-2 re-sample 1, J1FKK2		
		5/18/10			3/16/11			4/13/11			5/18/10			3/16/11		
		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	333	UJ	333	30	U	30	29	U	29	347	UJ	347	30	U	30
1,2-Dichlorobenzene	SVOA	333	U	333	24	U	24	23	U	23	347	U	347	23	U	23
1,3-Dichlorobenzene	SVOA	333	U	333	13	U	13	12	U	12	347	U	347	13	U	13
1,4-Dichlorobenzene	SVOA	333	U	333	15	U	15	14	U	14	347	U	347	14	U	14
2,4,5-Trichlorophenol	SVOA	333	UJ	333	11	U	11	10	U	10	347	UJ	347	11	U	11
2,4,6-Trichlorophenol	SVOA	333	UJ	333	11	U	11	10	U	10	347	UJ	347	11	U	11
2,4-Dichlorophenol	SVOA	333	U	333	11	U	11	10	U	10	347	U	347	11	U	11
2,4-Dimethylphenol	SVOA	333	U	333	71	U	71	69	U	69	347	U	347	70	U	70
2,4-Dinitrophenol	SVOA	1660	UJ	1660	360	U	360	350	U	350	1730	UJ	1730	350	U	350
2,4-Dinitrotoluene	SVOA	333	U	333	71	U	71	69	U	69	347	U	347	70	U	70
2,6-Dinitrotoluene	SVOA	333	U	333	30	U	30	29	U	29	347	U	347	30	U	30
2-Chloronaphthalene	SVOA	333	U	333	11	U	11	10	U	10	347	U	347	11	U	11
2-Chlorophenol	SVOA	333	U	333	22	U	22	22	U	22	347	U	347	22	U	22
2-Methylnaphthalene	SVOA	333	U	333	20	U	20	20	U	20	347	U	347	20	U	20
2-Methylphenol (cresol, o-)	SVOA	333	U	333	14	U	14	14	U	14	347	U	347	14	U	14
2-Nitroaniline	SVOA	1660	U	1660	53	U	53	52	U	52	1730	U	1730	53	U	53
2-Nitrophenol	SVOA	333	U	333	11	U	11	10	U	10	347	U	347	11	U	11
3,3'-Dichlorobenzidine	SVOA	665	U	665	96	U	96	94	U	94	693	U	693	95	U	95
3+4 Methylphenol (cresol, m+p)	SVOA	333	U	333	35	U	35	34	U	34	347	U	347	35	U	35
3-Nitroaniline	SVOA	1660	U	1660	78	U	78	76	U	76	1730	U	1730	77	U	77
4,6-Dinitro-2-methylphenol	SVOA	333	UJ	333	350	U	350	340	U	340	347	UJ	347	350	U	350
4-Bromophenylphenyl ether	SVOA	333	U	333	20	U	20	20	U	20	347	U	347	20	U	20
4-Chloro-3-methylphenol	SVOA	333	U	333	71	U	71	69	U	69	347	U	347	70	U	70
4-Chloroaniline	SVOA	333	U	333	87	U	87	85	U	85	347	U	347	87	U	87
4-Chlorophenylphenyl ether	SVOA	333	U	333	22	U	22	22	U	22	347	U	347	22	U	22
4-Nitroaniline	SVOA	1660	U	1660	77	U	77	75	U	75	1730	U	1730	77	U	77
4-Nitrophenol	SVOA	1660	U	1660	100	U	100	100	U	100	1730	U	1730	100	U	100
Acenaphthene	SVOA	333	U	333	11	U	11	11	U	11	347	U	347	11	U	11
Acenaphthylene	SVOA	333	U	333	18	U	18	18	U	18	347	U	347	18	U	18
Anthracene	SVOA	333	U	333	18	U	18	18	U	18	347	U	347	18	U	18
Benzo(a)anthracene	SVOA	333	U	333	26	J	21	36	J	21	347	U	347	29	J	21
Benzo(a)pyrene	SVOA	333	U	333	21	U	21	33	J	21	347	U	347	23	J	21
Benzo(b)fluoranthene	SVOA	333	U	333	43	JX	28	67	JK	27	347	U	347	47	JX	28
Benzo(ghi)perylene	SVOA	333	U	333	17	U	17	26	J	17	347	U	347	17	U	17
Benzo(k)fluoranthene	SVOA	333	U	333	43	UX	43	42	UK	42	347	U	347	42	UX	42
Bis(2-chloro-1-methylethyl)ether	SVOA	333	U	333	25	U	25	24	U	24	347	U	347	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	333	U	333	25	U	25	24	U	24	347	U	347	24	U	24
Bis(2-chloroethyl) ether	SVOA	333	U	333	18	U	18	17	U	17	347	U	347	18	U	18
Bis(2-ethylhexyl) phthalate	SVOA	333	U	333	49	U	49	94	JB	48	347	U	347	49	U	49
Butylbenzylphthalate	SVOA	333	U	333	46	U	46	45	U	45	347	U	347	46	U	46
Carbazole	SVOA	333	U	333	38	U	38	37	U	37	347	U	347	38	U	38
Chrysene	SVOA	333	U	333	29	U	29	39	J	28	347	U	347	29	J	29
Dibenz[a,h]anthracene	SVOA	333	U	333	20	U	20	20	U	20	347	U	347	20	U	20
Dibenzofuran	SVOA	333	U	333	21	U	21	21	U	21	347	U	347	21	U	21
Diethyl phthalate	SVOA	333	U	333	28	U	28	27	U	27	347	U	347	28	U	28
Dimethyl phthalate	SVOA	333	U	333	25	U	25	24	U	24	347	U	347	24	U	24
Di-n-butylphthalate	SVOA	333	U	333	31	U	31	30	U	30	347	U	347	31	U	31
Di-n-octylphthalate	SVOA	333	U	333	15	U	15	15	U	15	347	U	347	15	U	15
Fluoranthene	SVOA	333	U	333	45	J	38	59	J	37	347	U	347	40	J	38
Fluorene	SVOA	333	U	333	19	U	19	19	U	19	347	U	347	19	U	19
Hexachlorobenzene	SVOA	333	U	333	31	U	31	30	U	30	347	U	347	31	U	31
Hexachlorobutadiene	SVOA	333	U	333	11	U	11	10	U	10	347	U	347	11	U	11
Hexachlorocyclopentadiene	SVOA	333	UJ	333	53	U	53	52	U	52	347	UJ	347	53	U	53
Hexachloroethane	SVOA	333	U	333	23	U	23	22	U	22	347	U	347	23	U	23
Indeno(1,2,3-cd)pyrene	SVOA	333	U	333	24	U	24	23	U	23	347	U	347	23	U	23
Isophorone	SVOA	333	U	333	18	U	18	18	U	18	347	U	347	18	U	18
Naphthalene	SVOA	333	U	333	33	U	33	32	U	32	347	U	347	33	U	33
Nitrobenzene	SVOA	333	U	333	24	U	24	23	U	23	347	U	347	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	333	U	333	33	U	33	32	U	32	347	U	347	33	U	33
N-Nitrosodiphenylamine	SVOA	333	U	333	22	U	22	22	U	22	347	U	347	22	U	22
Pentachlorophenol	SVOA	1660	UJ	1660	350	U	350	340	U	340	1730	UJ	1730	350	U	350
Phenanthrene	SVOA	333	U	333	23	J	18	25	J	18	347	U	347	18	U	18
Phenol	SVOA	333	U	333	19	U	19	19	U	19	347	U	347	19	U	19
Pyrene	SVOA	333	U	333	43	J	13	57	J	13	347	U	347	43	J	13

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-2 re-sample 2, J1HH81			DZ-3 - J19YD3			DZ-3 re-sample 1, J1FKK3			DZ-3 re-sample 2, J1HH82			DZ-4 - J19YD4		
		4/13/11			5/18/10			3/16/11			4/13/11			5/18/10		
		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	29	U	29	346	UJ	346	34	U	34	27	U	27	346	UJ	346
1,2-Dichlorobenzene	SVOA	22	U	22	346	U	346	26	U	26	22	U	22	346	U	346
1,3-Dichlorobenzene	SVOA	12	U	12	346	U	346	14	U	14	12	U	12	346	U	346
1,4-Dichlorobenzene	SVOA	14	U	14	346	U	346	16	U	16	13	U	13	346	U	346
2,4,5-Trichlorophenol	SVOA	10	U	10	346	UJ	346	12	U	12	9.8	U	9.8	346	UJ	346
2,4,6-Trichlorophenol	SVOA	10	U	10	346	UJ	346	12	U	12	9.8	U	9.8	346	UJ	346
2,4-Dichlorophenol	SVOA	10	U	10	346	U	346	12	U	12	9.8	U	9.8	346	U	346
2,4-Dimethylphenol	SVOA	67	U	67	346	U	346	79	U	79	65	U	65	346	U	346
2,4-Dinitrophenol	SVOA	340	U	340	1730	UJ	1730	400	U	400	330	U	330	1730	UJ	1730
2,4-Dinitrotoluene	SVOA	67	U	67	346	U	346	79	U	79	65	U	65	346	U	346
2,6-Dinitrotoluene	SVOA	29	U	29	346	U	346	34	U	34	27	U	27	346	U	346
2-Chloronaphthalene	SVOA	10	U	10	346	U	346	12	U	12	9.8	U	9.8	346	U	346
2-Chlorophenol	SVOA	21	U	21	346	U	346	25	U	25	21	U	21	346	U	346
2-Methylnaphthalene	SVOA	19	U	19	346	U	346	23	U	23	19	U	19	346	U	346
2-Methylphenol (cresol, o-)	SVOA	13	U	13	346	U	346	16	U	16	13	U	13	346	U	346
2-Nitroaniline	SVOA	51	U	51	1730	U	1730	60	U	60	49	U	49	1730	U	1730
2-Nitrophenol	SVOA	10	U	10	346	U	346	12	U	12	9.8	U	9.8	346	U	346
3,3'-Dichlorobenzidine	SVOA	92	U	92	691	U	691	110	U	110	88	U	88	693	U	693
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	346	U	346	40	U	40	32	U	32	346	U	346
3-Nitroaniline	SVOA	75	U	75	1730	U	1730	88	U	88	72	U	72	1730	U	1730
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	346	UJ	346	400	U	400	320	U	320	346	UJ	346
4-Bromophenylphenyl ether	SVOA	19	U	19	346	U	346	23	U	23	19	U	19	346	U	346
4-Chloro-3-methylphenol	SVOA	67	U	67	346	U	346	79	U	79	65	U	65	346	U	346
4-Chloroaniline	SVOA	84	U	84	346	U	346	98	U	98	80	U	80	346	U	346
4-Chlorophenylphenyl ether	SVOA	21	U	21	346	U	346	25	U	25	21	U	21	346	U	346
4-Nitroaniline	SVOA	74	U	74	1730	U	1730	87	U	87	71	U	71	1730	U	1730
4-Nitrophenol	SVOA	99	U	99	1730	U	1730	120	U	120	95	U	95	1730	U	1730
Acenaphthene	SVOA	11	U	11	346	U	346	12	U	12	10	U	10	346	U	346
Acenaphthylene	SVOA	17	U	17	346	U	346	20	U	20	17	U	17	346	U	346
Anthracene	SVOA	17	U	17	346	U	346	20	U	20	17	U	17	346	U	346
Benzo(a)anthracene	SVOA	20	U	20	346	U	346	24	U	24	20	U	20	346	U	346
Benzo(a)pyrene	SVOA	20	U	20	346	U	346	24	U	24	20	U	20	346	U	346
Benzo(b)fluoranthene	SVOA	27	U	27	346	U	346	31	U	31	26	U	26	346	U	346
Benzo(ghi)perylene	SVOA	16	U	16	346	U	346	19	U	19	16	U	16	346	U	346
Benzo(k)fluoranthene	SVOA	41	U	41	346	U	346	48	U	48	39	U	39	346	U	346
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	346	U	346	28	U	28	23	U	23	346	U	346
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	346	U	346	28	U	28	23	U	23	346	U	346
Bis(2-chloroethyl) ether	SVOA	17	U	17	346	U	346	20	U	20	16	U	16	346	U	346
Bis(2-ethylhexyl) phthalate	SVOA	80	JB	47	346	U	346	55	U	55	72	JB	45	346	U	346
Butylbenzylphthalate	SVOA	44	U	44	346	U	346	52	U	52	42	U	42	346	U	346
Carbazole	SVOA	37	U	37	346	U	346	43	U	43	35	U	35	346	U	346
Chrysene	SVOA	28	U	28	53.9	J	346	32	U	32	26	U	26	346	U	346
Dibenz[a,h]anthracene	SVOA	19	U	19	346	U	346	23	U	23	19	U	19	346	U	346
Dibenzofuran	SVOA	20	U	20	346	U	346	24	U	24	20	U	20	346	U	346
Diethyl phthalate	SVOA	27	U	27	346	U	346	31	U	31	25	U	25	346	U	346
Dimethyl phthalate	SVOA	24	U	24	346	U	346	28	U	28	23	U	23	346	U	346
Di-n-butylphthalate	SVOA	30	U	30	346	U	346	35	U	35	28	U	28	346	U	346
Di-n-octylphthalate	SVOA	15	U	15	346	U	346	17	U	17	14	U	14	346	U	346
Fluoranthene	SVOA	37	U	37	85.7	J	85.7	43	U	43	35	U	35	58.1	J	346
Fluorene	SVOA	18	U	18	346	U	346	22	U	22	18	U	18	346	U	346
Hexachlorobenzene	SVOA	30	U	30	346	U	346	35	U	35	28	U	28	346	U	346
Hexachlorobutadiene	SVOA	10	U	10	346	U	346	12	U	12	9.8	U	9.8	346	U	346
Hexachlorocyclopentadiene	SVOA	51	U	51	346	UJ	346	60	U	60	49	U	49	346	UJ	346
Hexachloroethane	SVOA	22	U	22	346	U	346	26	U	26	21	U	21	346	U	346
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	346	U	346	26	U	26	22	U	22	346	U	346
Isophorone	SVOA	17	U	17	346	U	346	20	U	20	17	U	17	346	U	346
Naphthalene	SVOA	32	U	32	346	U	346	37	U	37	30	U	30	346	U	346
Nitrobenzene	SVOA	22	U	22	346	U	346	26	U	26	22	U	22	346	U	346
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	346	U	346	37	U	37	30	U	30	346	U	346
N-Nitrosodiphenylamine	SVOA	21	U	21	346	U	346	25	U	25	21	U	21	346	U	346
Pentachlorophenol	SVOA	340	U	340	1730	UJ	1730	400	U	400	320	U	320	1730	UJ	1730
Phenanthrene	SVOA	17	U	17	346	U	346	20	U	20	17	U	17	346	U	346
Phenol	SVOA	18	U	18	346	U	346	25	J	22	18	U	18	346	U	346
Pyrene	SVOA	12	U	12	85.4	J	346	16	J	15	12	U	12	52.9	J	346

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-4 re-sample 1, J1FKK4			DZ-4 re-sample 2, J1HH83			DZ-5 - J19YD5			DZ-5 re-sample 1, J1FKK5			DZ-6 - J19YD6		
		3/16/11			4/13/11			5/18/10			3/16/11			5/18/10		
		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	29	U	29	27	U	27	343	UJ	343	29	U	29	331	UJ	331
1,2-Dichlorobenzene	SVOA	23	U	23	22	U	22	343	U	343	23	U	23	331	U	331
1,3-Dichlorobenzene	SVOA	13	U	13	12	U	12	343	U	343	13	U	13	331	U	331
1,4-Dichlorobenzene	SVOA	14	U	14	13	U	13	343	U	343	14	U	14	331	U	331
2,4,5-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	343	UJ	343	11	U	11	331	UJ	331
2,4,6-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	343	UJ	343	11	U	11	331	UJ	331
2,4-Dichlorophenol	SVOA	10	U	10	9.8	U	9.8	343	U	343	11	U	11	331	U	331
2,4-Dimethylphenol	SVOA	69	U	69	65	U	65	343	U	343	69	U	69	331	U	331
2,4-Dinitrophenol	SVOA	350	U	350	330	U	330	1720	UJ	1720	350	U	350	1660	UJ	1660
2,4-Dinitrotoluene	SVOA	69	U	69	65	U	65	343	U	343	69	U	69	331	U	331
2,6-Dinitrotoluene	SVOA	29	U	29	27	U	27	343	U	343	29	U	29	331	U	331
2-Chloronaphthalene	SVOA	10	U	10	9.8	U	9.8	343	U	343	11	U	11	331	U	331
2-Chlorophenol	SVOA	22	U	22	21	U	21	343	U	343	22	U	22	331	U	331
2-Methylnaphthalene	SVOA	20	U	20	19	U	19	343	U	343	20	U	20	331	U	331
2-Methylphenol (cresol, o-)	SVOA	14	U	14	13	U	13	343	U	343	14	U	14	331	U	331
2-Nitroaniline	SVOA	52	U	52	49	U	49	1720	U	1720	53	U	53	1660	U	1660
2-Nitrophenol	SVOA	10	U	10	9.8	U	9.8	343	U	343	11	U	11	331	U	331
3,3'-Dichlorobenzidine	SVOA	94	U	94	88	U	88	687	U	687	95	U	95	662	U	662
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	32	U	32	343	U	343	35	U	35	331	U	331
3-Nitroaniline	SVOA	76	U	76	71	U	71	1720	U	1720	77	U	77	1660	U	1660
4,6-Dinitro-2-methylphenol	SVOA	350	U	350	320	U	320	343	UJ	343	350	U	350	331	UJ	331
4-Bromophenylphenyl ether	SVOA	20	U	20	19	U	19	343	U	343	20	U	20	331	U	331
4-Chloro-3-methylphenol	SVOA	69	U	69	65	U	65	343	U	343	69	U	69	331	U	331
4-Chloroaniline	SVOA	86	U	86	80	U	80	343	U	343	86	U	86	331	U	331
4-Chlorophenylphenyl ether	SVOA	22	U	22	21	U	21	343	U	343	22	U	22	331	U	331
4-Nitroaniline	SVOA	76	U	76	71	U	71	1720	U	1720	76	U	76	1660	U	1660
4-Nitrophenol	SVOA	100	U	100	95	U	95	1720	U	1720	100	U	100	1660	U	1660
Acenaphthene	SVOA	11	U	11	10	U	10	343	U	343	11	U	11	331	U	331
Acenaphthylene	SVOA	18	U	18	17	U	17	343	U	343	18	U	18	331	U	331
Anthracene	SVOA	18	U	18	17	U	17	343	U	343	18	U	18	92.2	J	331
Benzo(a)anthracene	SVOA	21	U	21	69	J	20	343	U	343	21	U	21	212	J	331
Benzo(a)pyrene	SVOA	21	U	21	60	J	20	343	U	343	21	U	21	164	J	331
Benzo(b)fluoranthene	SVOA	27	U	27	150	JK	26	343	U	343	28	U	28	152	J	331
Benzo(ghi)perylene	SVOA	17	U	17	50	J	16	343	U	343	17	U	17	119	J	331
Benzo(k)fluoranthene	SVOA	42	U	42	39	UK	39	343	U	343	42	U	42	158	J	331
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	23	U	23	343	U	343	24	U	24	331	U	331
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	23	U	23	343	U	343	24	U	24	331	U	331
Bis(2-chloroethyl) ether	SVOA	17	U	17	16	U	16	343	U	343	17	U	17	331	U	331
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	89	JB	45	343	U	343	48	U	48	331	U	331
Butylbenzylphthalate	SVOA	45	U	45	42	U	42	343	U	343	45	U	45	331	U	331
Carbazole	SVOA	38	U	38	35	U	35	343	U	343	38	U	38	331	U	331
Chrysene	SVOA	28	U	28	67	J	26	343	U	343	28	U	28	219	J	331
Dibenz[a,h]anthracene	SVOA	20	U	20	19	U	19	343	U	343	20	U	20	331	U	331
Dibenzofuran	SVOA	21	U	21	20	U	20	343	U	343	21	U	21	331	U	331
Diethyl phthalate	SVOA	27	U	27	25	U	25	343	U	343	27	U	27	331	U	331
Dimethyl phthalate	SVOA	24	U	24	23	U	23	343	U	343	24	U	24	331	U	331
Di-n-butylphthalate	SVOA	30	U	30	28	U	28	343	U	343	30	U	30	331	U	331
Di-n-octylphthalate	SVOA	15	U	15	14	U	14	343	U	343	15	U	15	331	U	331
Fluoranthene	SVOA	38	U	38	81	J	35	343	U	343	38	U	38	543		331
Fluorene	SVOA	19	U	19	18	U	18	343	U	343	19	U	19	331	U	331
Hexachlorobenzene	SVOA	30	U	30	28	U	28	343	U	343	30	U	30	331	U	331
Hexachlorobutadiene	SVOA	10	U	10	9.8	U	9.8	343	U	343	11	U	11	331	U	331
Hexachlorocyclopentadiene	SVOA	52	U	52	49	U	49	343	UJ	343	53	U	53	331	UJ	331
Hexachloroethane	SVOA	22	U	22	21	U	21	343	U	343	22	U	22	331	U	331
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	42	J	22	343	U	343	23	U	23	102	J	331
Isophorone	SVOA	18	U	18	17	U	17	343	U	343	18	U	18	331	U	331
Naphthalene	SVOA	32	U	32	30	U	30	343	U	343	33	U	33	331	U	331
Nitrobenzene	SVOA	23	U	23	22	U	22	343	U	343	23	U	23	331	U	331
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	30	U	30	343	U	343	33	U	33	331	U	331
N-Nitrosodiphenylamine	SVOA	22	U	22	21	U	21	343	U	343	22	U	22	331	U	331
Pentachlorophenol	SVOA	350	U	350	320	U	320	1720	UJ	1720	350	U	350	1660	UJ	1660
Phenanthrene	SVOA	18	U	18	21	J	17	343	U	343	18	U	18	408		331
Phenol	SVOA	19	U	19	18	U	18	343	U	343	19	U	19	331	U	331
Pyrene	SVOA	13	U	13	84	J	12	343	U	343	13	U	13	335		331

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-6 re-sample 1, J1FKK6			DZ-7 - J19YD7			DZ-7 re-sample 1, J1FKK7			DZ-7 re-sample 2, J1HH84			DZ-8 - J19YD8		
		3/16/11			5/18/10			3/16/11			4/13/11			5/18/10		
		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	28	U	28	344	UJ	344	30	U	30	29	U	29	349	UJ	349
1,2-Dichlorobenzene	SVOA	22	U	22	344	U	344	23	U	23	23	U	23	349	U	349
1,3-Dichlorobenzene	SVOA	12	U	12	344	U	344	13	U	13	13	U	13	349	U	349
1,4-Dichlorobenzene	SVOA	14	U	14	344	U	344	14	U	14	14	U	14	349	U	349
2,4,5-Trichlorophenol	SVOA	10	U	10	344	UJ	344	11	U	11	11	U	11	349	UJ	349
2,4,6-Trichlorophenol	SVOA	10	U	10	344	UJ	344	11	U	11	11	U	11	349	UJ	349
2,4-Dichlorophenol	SVOA	10	U	10	344	U	344	11	U	11	11	U	11	349	U	349
2,4-Dimethylphenol	SVOA	67	U	67	344	U	344	70	U	70	69	U	69	349	U	349
2,4-Dinitrophenol	SVOA	340	U	340	1720	UJ	1720	350	U	350	350	U	350	1740	UJ	1740
2,4-Dinitrotoluene	SVOA	67	U	67	344	U	344	70	U	70	69	U	69	349	U	349
2,6-Dinitrotoluene	SVOA	28	U	28	344	U	344	30	U	30	29	U	29	349	U	349
2-Chloronaphthalene	SVOA	10	U	10	344	U	344	11	U	11	11	U	11	349	U	349
2-Chlorophenol	SVOA	21	U	21	344	U	344	22	U	22	22	U	22	349	U	349
2-Methylnaphthalene	SVOA	19	U	19	344	U	344	20	U	20	20	U	20	349	U	349
2-Methylphenol (cresol, o-)	SVOA	13	U	13	344	U	344	14	U	14	14	U	14	349	U	349
2-Nitroaniline	SVOA	51	U	51	1720	U	1720	53	U	53	53	U	53	1740	U	1740
2-Nitrophenol	SVOA	10	U	10	344	U	344	11	U	11	11	U	11	349	U	349
3,3'-Dichlorobenzidine	SVOA	91	U	91	689	U	689	96	U	96	95	U	95	698	U	698
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	344	U	344	35	U	35	35	U	35	349	U	349
3-Nitroaniline	SVOA	74	U	74	1720	U	1720	77	U	77	77	U	77	1740	U	1740
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	344	UJ	344	350	U	350	350	U	350	349	UJ	349
4-Bromophenylphenyl ether	SVOA	19	U	19	344	U	344	20	U	20	20	U	20	349	U	349
4-Chloro-3-methylphenol	SVOA	67	U	67	344	U	344	70	U	70	69	U	69	349	U	349
4-Chloroaniline	SVOA	83	U	83	344	U	344	87	U	87	86	U	86	349	U	349
4-Chlorophenylphenyl ether	SVOA	21	U	21	344	U	344	22	U	22	22	U	22	349	U	349
4-Nitroaniline	SVOA	74	U	74	1720	U	1720	77	U	77	76	U	76	1740	U	1740
4-Nitrophenol	SVOA	99	U	99	1720	U	1720	100	U	100	100	U	100	1740	U	1740
Acenaphthene	SVOA	10	U	10	344	U	344	11	U	11	11	U	11	349	U	349
Acenaphthylene	SVOA	17	U	17	344	U	344	18	U	18	18	U	18	349	U	349
Anthracene	SVOA	17	U	17	344	U	344	18	U	18	18	U	18	349	U	349
Benzo(a)anthracene	SVOA	20	U	20	682		344	30	J	21	21	U	21	349	U	349
Benzo(a)pyrene	SVOA	20	U	20	515		344	36	J	21	21	U	21	349	U	349
Benzo(b)fluoranthene	SVOA	27	U	27	666		344	51	JX	28	28	U	28	349	U	349
Benzo(ghi)perylene	SVOA	16	U	16	481		344	17	U	17	17	U	17	349	U	349
Benzo(k)fluoranthene	SVOA	41	U	41	566		344	42	UX	42	42	U	42	349	U	349
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	344	U	344	24	U	24	24	U	24	349	U	349
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	344	U	344	24	U	24	24	U	24	349	U	349
Bis(2-chloroethyl) ether	SVOA	17	U	17	344	U	344	18	U	18	17	U	17	349	U	349
Bis(2-ethylhexyl) phthalate	SVOA	47	U	47	344	U	344	49	U	49	78	JB	48	349	U	349
Butylbenzylphthalate	SVOA	44	U	44	344	U	344	46	U	46	45	U	45	349	U	349
Carbazole	SVOA	37	U	37	344	U	344	38	U	38	38	U	38	349	U	349
Chrysene	SVOA	27	U	27	724		344	35	J	29	28	U	28	349	U	349
Dibenz[a,h]anthracene	SVOA	19	U	19	134	J	344	20	U	20	20	U	20	349	U	349
Dibenzofuran	SVOA	20	U	20	344	U	344	21	U	21	21	U	21	349	U	349
Diethyl phthalate	SVOA	26	U	26	344	U	344	28	U	28	27	U	27	349	U	349
Dimethyl phthalate	SVOA	23	U	23	344	U	344	24	U	24	24	U	24	349	U	349
Di-n-butylphthalate	SVOA	29	U	29	344	U	344	31	U	31	30	U	30	349	U	349
Di-n-octylphthalate	SVOA	15	U	15	344	U	344	15	U	15	15	U	15	349	U	349
Fluoranthene	SVOA	37	U	37	954		344	57	J	38	38	U	38	349	U	349
Fluorene	SVOA	18	U	18	344	U	344	19	U	19	19	U	19	349	U	349
Hexachlorobenzene	SVOA	29	U	29	344	U	344	31	U	31	30	U	30	349	U	349
Hexachlorobutadiene	SVOA	10	U	10	344	U	344	11	U	11	11	U	11	349	U	349
Hexachlorocyclopentadiene	SVOA	51	U	51	344	UJ	344	53	U	53	53	U	53	349	UJ	349
Hexachloroethane	SVOA	22	U	22	344	U	344	23	U	23	22	U	22	349	U	349
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	397		344	23	U	23	23	U	23	349	U	349
Isophorone	SVOA	17	U	17	344	U	344	18	U	18	18	U	18	349	U	349
Naphthalene	SVOA	31	U	31	344	U	344	33	U	33	33	U	33	349	U	349
Nitrobenzene	SVOA	22	U	22	344	U	344	23	U	23	23	U	23	349	U	349
N-Nitroso-di-n-dipropylamine	SVOA	31	U	31	344	U	344	33	U	33	33	U	33	349	U	349
N-Nitrosodiphenylamine	SVOA	21	U	21	344	U	344	22	U	22	22	U	22	349	U	349
Pentachlorophenol	SVOA	340	U	340	1720	UJ	1720	350	U	350	350	U	350	1740	UJ	1740
Phenanthrene	SVOA	17	U	17	78.4	J	344	39	J	18	18	U	18	349	U	349
Phenol	SVOA	18	U	18	344	U	344	19	U	19	19	U	19	349	U	349
Pyrene	SVOA	12	U	12	868		344	68	J	13	13	U	13	349	U	349

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-8 re-sample 1, J1FKK8			DZ-8 re-sample 2, J1HH85			DZ-9 - J19YD9			DZ-9 re-sample 1, J1FKK9			DZ-10 - J19YF0		
		3/16/11			4/13/11			5/18/10			3/16/11			5/18/10		
		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	30	U	30	28	U	28	335	UJ	335	27	U	27	343	UJ	343
1,2-Dichlorobenzene	SVOA	23	U	23	22	U	22	335	U	335	22	U	22	343	U	343
1,3-Dichlorobenzene	SVOA	13	U	13	12	U	12	335	U	335	12	U	12	343	U	343
1,4-Dichlorobenzene	SVOA	14	U	14	14	U	14	335	U	335	13	U	13	343	U	343
2,4,5-Trichlorophenol	SVOA	11	U	11	10	U	10	335	UJ	335	9.8	U	9.8	343	UJ	343
2,4,6-Trichlorophenol	SVOA	11	U	11	10	U	10	335	UJ	335	9.8	U	9.8	343	UJ	343
2,4-Dichlorophenol	SVOA	11	U	11	10	U	10	335	U	335	9.8	U	9.8	343	U	343
2,4-Dimethylphenol	SVOA	70	U	70	67	U	67	335	U	335	65	U	65	343	U	343
2,4-Dinitrophenol	SVOA	350	U	350	340	U	340	1680	UJ	1680	330	U	330	1720	UJ	1720
2,4-Dinitrotoluene	SVOA	70	U	70	67	U	67	335	U	335	65	U	65	343	U	343
2,6-Dinitrotoluene	SVOA	30	U	30	28	U	28	335	U	335	27	U	27	343	U	343
2-Chloronaphthalene	SVOA	11	U	11	10	U	10	335	U	335	9.8	U	9.8	343	U	343
2-Chlorophenol	SVOA	22	U	22	21	U	21	335	U	335	21	U	21	343	U	343
2-Methylnaphthalene	SVOA	20	U	20	19	U	19	335	U	335	19	U	19	343	U	343
2-Methylphenol (cresol, o-)	SVOA	14	U	14	13	U	13	335	U	335	13	U	13	343	U	343
2-Nitroaniline	SVOA	53	U	53	51	U	51	1680	U	1680	49	U	49	1720	U	1720
2-Nitrophenol	SVOA	11	U	11	10	U	10	335	U	335	9.8	U	9.8	343	U	343
3,3'-Dichlorobenzidine	SVOA	95	U	95	91	U	91	670	U	670	88	U	88	687	U	687
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	34	U	34	335	U	335	32	U	32	343	U	343
3-Nitroaniline	SVOA	77	U	77	74	U	74	1680	U	1680	71	U	71	1720	U	1720
4,6-Dinitro-2-methylphenol	SVOA	350	U	350	340	U	340	335	UJ	335	320	U	320	343	UJ	343
4-Bromophenylphenyl ether	SVOA	20	U	20	19	U	19	335	U	335	19	U	19	343	U	343
4-Chloro-3-methylphenol	SVOA	70	U	70	67	U	67	335	U	335	65	U	65	343	U	343
4-Chloroaniline	SVOA	86	U	86	83	U	83	335	U	335	80	U	80	343	U	343
4-Chlorophenylphenyl ether	SVOA	22	U	22	21	U	21	335	U	335	21	U	21	343	U	343
4-Nitroaniline	SVOA	76	U	76	74	U	74	1680	U	1680	71	U	71	1720	U	1720
4-Nitrophenol	SVOA	100	U	100	98	U	98	1680	U	1680	95	U	95	1720	U	1720
Acenaphthene	SVOA	11	U	11	10	U	10	335	U	335	10	U	10	343	U	343
Acenaphthylene	SVOA	18	U	18	17	U	17	335	U	335	17	U	17	343	U	343
Anthracene	SVOA	18	U	18	17	U	17	335	U	335	17	U	17	343	U	343
Benzo(a)anthracene	SVOA	21	U	21	20	U	20	335	U	335	20	U	20	343	U	343
Benzo(a)pyrene	SVOA	21	U	21	20	U	20	335	U	335	20	U	20	343	U	343
Benzo(b)fluoranthene	SVOA	28	U	28	27	U	27	335	U	335	26	U	26	343	U	343
Benzo(ghi)perylene	SVOA	17	U	17	16	U	16	335	U	335	16	U	16	343	U	343
Benzo(k)fluoranthene	SVOA	42	U	42	41	U	41	335	U	335	39	U	39	343	U	343
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	23	U	23	335	U	335	23	U	23	343	U	343
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	23	U	23	335	U	335	23	U	23	343	U	343
Bis(2-chloroethyl) ether	SVOA	17	U	17	17	U	17	335	U	335	16	U	16	343	U	343
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	69	JB	47	335	U	335	45	U	45	343	U	343
Butylbenzylphthalate	SVOA	45	U	45	44	U	44	335	U	335	42	U	42	343	U	343
Carbazole	SVOA	38	U	38	37	U	37	335	U	335	35	U	35	343	U	343
Chrysene	SVOA	28	U	28	27	U	27	335	U	335	26	U	26	343	U	343
Dibenz[a,h]anthracene	SVOA	20	U	20	19	U	19	335	U	335	19	U	19	343	U	343
Dibenzofuran	SVOA	21	U	21	20	U	20	335	U	335	20	U	20	343	U	343
Diethyl phthalate	SVOA	27	U	27	26	U	26	335	U	335	25	U	25	343	U	343
Dimethyl phthalate	SVOA	24	U	24	23	U	23	335	U	335	23	U	23	343	U	343
Di-n-butylphthalate	SVOA	31	U	31	29	U	29	335	U	335	28	U	28	343	U	343
Di-n-octylphthalate	SVOA	15	U	15	15	U	15	335	U	335	14	U	14	343	U	343
Fluoranthene	SVOA	38	U	38	37	U	37	335	U	335	35	U	35	343	U	343
Fluorene	SVOA	19	U	19	18	U	18	335	U	335	18	U	18	343	U	343
Hexachlorobenzene	SVOA	31	U	31	29	U	29	335	U	335	28	U	28	343	U	343
Hexachlorobutadiene	SVOA	11	U	11	10	U	10	335	U	335	9.8	U	9.8	343	U	343
Hexachlorocyclopentadiene	SVOA	53	U	53	51	U	51	335	UJ	335	49	U	49	343	UJ	343
Hexachloroethane	SVOA	22	U	22	22	U	22	335	U	335	21	U	21	343	U	343
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	22	U	22	335	U	335	22	U	22	343	U	343
Isophorone	SVOA	18	U	18	17	U	17	335	U	335	17	U	17	343	U	343
Naphthalene	SVOA	33	U	33	31	U	31	335	U	335	30	U	30	343	U	343
Nitrobenzene	SVOA	23	U	23	22	U	22	335	U	335	22	U	22	343	U	343
N-Nitroso-di-n-dipropylamine	SVOA	33	U	33	31	U	31	335	U	335	30	U	30	343	U	343
N-Nitrosodiphenylamine	SVOA	22	U	22	21	U	21	335	U	335	21	U	21	343	U	343
Pentachlorophenol	SVOA	350	U	350	340	U	340	1680	UJ	1680	320	U	320	1720	UJ	1720
Phenanthrene	SVOA	18	U	18	17	U	17	335	U	335	17	U	17	343	U	343
Phenol	SVOA	19	U	19	18	U	18	335	U	335	18	U	18	343	U	343
Pyrene	SVOA	13	U	13	12	U	12	335	U	335	12	U	12	343	U	343

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	DZ-10 re-sample 1, J1FKL0			DZ-11 - J19YF1			DZ-11 re-sample 1, J1FKL1			DZ-12 - J19YF2			DZ-12 re-sample 1, J1FKL2		
		3/16/11			5/18/10			3/16/11			5/18/10			3/16/11		
		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	29	U	29	350	U	350	31	U	31	340	U	340	29	U	29
1,2-Dichlorobenzene	SVOA	22	U	22	350	U	350	24	U	24	340	U	340	23	U	23
1,3-Dichlorobenzene	SVOA	12	U	12	350	U	350	13	U	13	340	U	340	12	U	12
1,4-Dichlorobenzene	SVOA	14	U	14	350	U	350	15	U	15	340	U	340	14	U	14
2,4,5-Trichlorophenol	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
2,4,6-Trichlorophenol	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
2,4-Dichlorophenol	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
2,4-Dimethylphenol	SVOA	67	U	67	350	U	350	73	U	73	340	U	340	69	U	69
2,4-Dinitrophenol	SVOA	340	U	340	1750	U	1750	370	U	370	1700	U	1700	350	U	350
2,4-Dinitrotoluene	SVOA	67	U	67	350	U	350	73	U	73	340	U	340	69	U	69
2,6-Dinitrotoluene	SVOA	29	U	29	350	U	350	31	U	31	340	U	340	29	U	29
2-Chloronaphthalene	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
2-Chlorophenol	SVOA	21	U	21	350	U	350	23	U	23	340	U	340	22	U	22
2-Methylnaphthalene	SVOA	19	U	19	350	U	350	21	U	21	340	U	340	20	U	20
2-Methylphenol (cresol, o-)	SVOA	13	U	13	350	U	350	14	U	14	340	U	340	14	U	14
2-Nitroaniline	SVOA	51	U	51	1750	U	1750	55	U	55	1700	U	1700	52	U	52
2-Nitrophenol	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
3,3'-Dichlorobenzidine	SVOA	92	U	92	700	U	700	99	U	99	679	U	679	94	U	94
3+4 Methylphenol (cresol, m+p)	SVOA	34	U	34	350	U	350	36	U	36	340	U	340	34	U	34
3-Nitroaniline	SVOA	74	U	74	1750	U	1750	80	U	80	1700	U	1700	76	U	76
4,6-Dinitro-2-methylphenol	SVOA	340	U	340	350	U	350	360	U	360	340	U	340	340	U	340
4-Bromophenylphenyl ether	SVOA	19	U	19	350	U	350	21	U	21	340	U	340	20	U	20
4-Chloro-3-methylphenol	SVOA	67	U	67	350	U	350	73	U	73	340	U	340	69	U	69
4-Chloroaniline	SVOA	83	U	83	350	U	350	90	U	90	340	U	340	85	U	85
4-Chlorophenylphenyl ether	SVOA	21	U	21	350	U	350	23	U	23	340	U	340	22	U	22
4-Nitroaniline	SVOA	74	U	74	1750	U	1750	80	U	80	1700	U	1700	76	U	76
4-Nitrophenol	SVOA	99	U	99	1750	U	1750	110	U	110	1700	U	1700	100	U	100
Acenaphthene	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	11	U	11
Acenaphthylene	SVOA	17	U	17	350	U	350	19	U	19	340	U	340	18	U	18
Anthracene	SVOA	17	U	17	350	U	350	19	U	19	340	U	340	18	U	18
Benzo(a)anthracene	SVOA	20	U	20	350	U	350	22	U	22	340	U	340	21	U	21
Benzo(a)pyrene	SVOA	20	U	20	350	U	350	22	U	22	340	U	340	21	U	21
Benzo(b)fluoranthene	SVOA	27	U	27	350	U	350	29	U	29	340	U	340	27	U	27
Benzo(ghi)perylene	SVOA	16	U	16	350	U	350	18	U	18	340	U	340	17	U	17
Benzo(k)fluoranthene	SVOA	41	U	41	350	U	350	44	U	44	55.4	J	340	42	U	42
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	350	U	350	25	U	25	340	U	340	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	350	U	350	25	U	25	340	U	340	24	U	24
Bis(2-chloroethyl) ether	SVOA	17	U	17	350	U	350	18	U	18	340	U	340	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	47	U	47	350	U	350	51	U	51	340	U	340	48	U	48
Butylbenzylphthalate	SVOA	44	U	44	350	U	350	47	U	47	340	U	340	45	U	45
Carbazole	SVOA	37	U	37	350	U	350	40	U	40	340	U	340	37	U	37
Chrysene	SVOA	28	U	28	350	U	350	30	U	30	54.1	J	340	28	U	28
Dibenz[a,h]anthracene	SVOA	19	U	19	350	U	350	21	U	21	340	U	340	20	U	20
Dibenzofuran	SVOA	20	U	20	350	U	350	22	U	22	340	U	340	21	U	21
Diethyl phthalate	SVOA	27	U	27	350	U	350	29	U	29	340	U	340	27	U	27
Dimethyl phthalate	SVOA	23	U	23	350	U	350	25	U	25	340	U	340	24	U	24
Di-n-butylphthalate	SVOA	30	U	30	350	U	350	32	U	32	340	U	340	30	U	30
Di-n-octylphthalate	SVOA	15	U	15	350	U	350	16	U	16	340	U	340	15	U	15
Fluoranthene	SVOA	37	U	37	350	U	350	40	U	40	78.6	J	340	37	U	37
Fluorene	SVOA	18	U	18	350	U	350	20	U	20	340	U	340	19	U	19
Hexachlorobenzene	SVOA	30	U	30	350	U	350	32	U	32	340	U	340	30	U	30
Hexachlorobutadiene	SVOA	10	U	10	350	U	350	11	U	11	340	U	340	10	U	10
Hexachlorocyclopentadiene	SVOA	51	U	51	350	U	350	55	U	55	340	U	340	52	U	52
Hexachloroethane	SVOA	22	U	22	350	U	350	23	U	23	340	U	340	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	350	U	350	24	U	24	340	U	340	23	U	23
Isophorone	SVOA	17	U	17	350	U	350	19	U	19	340	U	340	18	U	18
Naphthalene	SVOA	32	U	32	350	U	350	34	U	34	340	U	340	32	U	32
Nitrobenzene	SVOA	22	U	22	350	U	350	24	U	24	340	U	340	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	350	U	350	34	U	34	340	U	340	32	U	32
N-Nitrosodiphenylamine	SVOA	21	U	21	350	U	350	23	U	23	340	U	340	22	U	22
Pentachlorophenol	SVOA	340	U	340	1750	U	1750	360	U	360	1700	U	1700	340	U	340
Phenanthrene	SVOA	17	U	17	350	U	350	19	U	19	340	U	340	18	U	18
Phenol	SVOA	18	U	18	350	U	350	20	U	20	340	U	340	19	U	19
Pyrene	SVOA	12	U	12	350	U	350	13	U	13	78.1	J	340	13	U	13

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Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	Duplicate of J19YD1 - J19YF3			Duplicate of J1FKK8, J1FKL3			Duplicate of J1HH85 re-sample 2, J1HH86			Equipment Blank - J19YK0		
		5/18/10			3/16/11			4/13/11			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	343	U	343	30	U	30	29	U	29	334	U	334
1,2-Dichlorobenzene	SVOA	343	U	343	24	U	24	23	U	23	334	U	334
1,3-Dichlorobenzene	SVOA	343	U	343	13	U	13	12	U	12	334	U	334
1,4-Dichlorobenzene	SVOA	343	U	343	15	U	15	14	U	14	334	U	334
2,4,5-Trichlorophenol	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
2,4,6-Trichlorophenol	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
2,4-Dichlorophenol	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
2,4-Dimethylphenol	SVOA	343	U	343	71	U	71	68	U	68	334	U	334
2,4-Dinitrophenol	SVOA	1720	U	1720	360	U	360	340	U	340	1670	U	1670
2,4-Dinitrotoluene	SVOA	343	U	343	71	U	71	68	U	68	334	U	334
2,6-Dinitrotoluene	SVOA	343	U	343	30	U	30	29	U	29	334	U	334
2-Chloronaphthalene	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
2-Chlorophenol	SVOA	343	U	343	22	U	22	22	U	22	334	U	334
2-Methylnaphthalene	SVOA	343	U	343	20	U	20	19	U	19	334	U	334
2-Methylphenol (cresol, o-)	SVOA	343	U	343	14	U	14	13	U	13	334	U	334
2-Nitroaniline	SVOA	1720	U	1720	54	U	54	51	U	51	1670	U	1670
2-Nitrophenol	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
3,3'-Dichlorobenzidine	SVOA	687	U	687	96	U	96	92	U	92	668	U	668
3+4 Methylphenol (cresol, m+p)	SVOA	343	U	343	35	U	35	34	U	34	334	U	334
3-Nitroaniline	SVOA	1720	U	1720	78	U	78	75	U	75	1670	U	1670
4,6-Dinitro-2-methylphenol	SVOA	343	U	343	350	U	350	340	U	340	334	U	334
4-Bromophenylphenyl ether	SVOA	343	U	343	20	U	20	19	U	19	334	U	334
4-Chloro-3-methylphenol	SVOA	343	U	343	71	U	71	68	U	68	334	U	334
4-Chloroaniline	SVOA	343	U	343	88	U	88	84	U	84	334	U	334
4-Chlorophenylphenyl ether	SVOA	343	U	343	22	U	22	22	U	22	334	U	334
4-Nitroaniline	SVOA	1720	U	1720	78	U	78	74	U	74	1670	U	1670
4-Nitrophenol	SVOA	1720	U	1720	100	U	100	99	U	99	1670	U	1670
Acenaphthene	SVOA	343	U	343	11	U	11	11	U	11	334	U	334
Acenaphthylene	SVOA	343	U	343	18	U	18	17	U	17	334	U	334
Anthracene	SVOA	343	U	343	18	U	18	17	U	17	334	U	334
Benzo(a)anthracene	SVOA	343	U	343	21	U	21	20	U	20	334	U	334
Benzo(a)pyrene	SVOA	343	U	343	21	U	21	20	U	20	334	U	334
Benzo(b)fluoranthene	SVOA	343	U	343	28	U	28	27	U	27	334	U	334
Benzo(ghi)perylene	SVOA	343	U	343	17	U	17	16	U	16	334	U	334
Benzo(k)fluoranthene	SVOA	343	U	343	43	U	43	41	U	41	334	U	334
Bis(2-chloro-1-methylethyl)ether	SVOA	343	U	343	25	U	25	24	U	24	334	U	334
Bis(2-Chloroethoxy)methane	SVOA	343	U	343	25	U	25	24	U	24	334	U	334
Bis(2-chloroethyl) ether	SVOA	343	U	343	18	U	18	17	U	17	334	U	334
Bis(2-ethylhexyl) phthalate	SVOA	343	U	343	49	U	49	83	JB	47	334	U	334
Butylbenzylphthalate	SVOA	343	U	343	46	U	46	44	U	44	334	U	334
Carbazole	SVOA	343	U	343	39	U	39	37	U	37	334	U	334
Chrysene	SVOA	343	U	343	29	U	29	28	U	28	334	U	334
Dibenz[a,h]anthracene	SVOA	343	U	343	20	U	20	19	U	19	334	U	334
Dibenzofuran	SVOA	343	U	343	21	U	21	20	U	20	334	U	334
Diethyl phthalate	SVOA	343	U	343	28	U	28	27	U	27	116	J	334
Dimethyl phthalate	SVOA	343	U	343	25	U	25	24	U	24	334	U	334
Di-n-butylphthalate	SVOA	343	U	343	31	U	31	30	U	30	58.7	J	334
Di-n-octylphthalate	SVOA	343	U	343	15	U	15	15	U	15	334	U	334
Fluoranthene	SVOA	343	U	343	39	U	39	37	U	37	334	U	334
Fluorene	SVOA	343	U	343	19	U	19	18	U	18	334	U	334
Hexachlorobenzene	SVOA	343	U	343	31	U	31	30	U	30	334	U	334
Hexachlorobutadiene	SVOA	343	U	343	11	U	11	10	U	10	334	U	334
Hexachlorocyclopentadiene	SVOA	343	U	343	54	U	54	51	U	51	334	U	334
Hexachloroethane	SVOA	343	U	343	23	U	23	22	U	22	334	U	334
Indeno(1,2,3-cd)pyrene	SVOA	343	U	343	24	U	24	23	U	23	334	U	334
Isophorone	SVOA	343	U	343	18	U	18	17	U	17	334	U	334
Naphthalene	SVOA	343	U	343	33	U	33	32	U	32	334	U	334
Nitrobenzene	SVOA	343	U	343	24	U	24	23	U	23	334	U	334
N-Nitroso-di-n-dipropylamine	SVOA	343	U	343	33	U	33	32	U	32	334	U	334
N-Nitrosodiphenylamine	SVOA	343	U	343	22	U	22	22	U	22	334	U	334
Pentachlorophenol	SVOA	1720	U	1720	350	U	350	340	U	340	1670	U	1670
Phenanthrene	SVOA	343	U	343	18	U	18	17	U	17	334	U	334
Phenol	SVOA	343	U	343	19	U	19	18	U	18	334	U	334
Pyrene	SVOA	343	U	343	13	U	13	12	U	12	334	U	334

Attachment	1	Sheet No.	53 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-5 - J19YF8			Duplicate of J19YF8 - J19YH6			OB-1 - J19YF4			OB-2 - J19YF5			OB-3 - J19YF6		
		5/13/10			5/13/10			5/13/10			5/13/10			5/13/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.25	U	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Acenaphthylene	PAH	3.25	U	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Anthracene	PAH	1.66	J	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Benzo(a)anthracene	PAH	5.88		3.25	4.07		3.25	3.35	U	3.35	3.26	U	3.26	0.974	J	3.35
Benzo(a)pyrene	PAH	7.38		3.25	4.25		3.25	3.35	U	3.35	1.24	J	3.26	1.7	J	3.35
Benzo(b)fluoranthene	PAH	8.77		3.25	7.52		3.25	3.35	U	3.35	3.26	U	3.26	1.44	J	3.35
Benzo(ghi)perylene	PAH	4.89		3.25	3.03	J	3.25	3.35	U	3.35	3.26	U	3.26	1.56	J	3.35
Benzo(k)fluoranthene	PAH	3.72		3.25	2.31	J	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Chrysene	PAH	3.77		3.25	1.17	J	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Dibenz[a,h]anthracene	PAH	0.894	J	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Fluoranthene	PAH	21		3.25	9.18		3.25	3.98		3.35	1.39	J	3.26	6.45		3.35
Fluorene	PAH	3.25	U	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Indeno(1,2,3-cd)pyrene	PAH	5.72		3.25	4.02		3.25	0.839	J	3.35	1.08	J	3.26	1.56	J	3.35
Naphthalene	PAH	3.25	U	3.25	3.25	U	3.25	3.35	U	3.35	3.26	U	3.26	3.35	U	3.35
Phenanthrene	PAH	6.78		3.25	3.08	J	3.25	1.31	J	3.35	1.19	J	3.26	1.38	J	3.35
Pyrene	PAH	17.2		3.25	7.13		3.25	1.44	J	3.35	1.27	J	3.26	3.14	J	3.35
Aroclor-1016	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1221	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1232	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1242	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1248	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1254	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aroclor-1260	PCB	13.2	U	13.2	13.2	U	13.2	13.4	U	13.4	13.3	U	13.3	13.2	U	13.2
Aldrin	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Alpha-BHC	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
alpha-Chlordane	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Beta-BHC	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Delta-BHC	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
4,4'-DDD	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
4,4'-DDE	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
4,4'-DDT	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Dieldrin	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endosulfan I	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endosulfan II	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endosulfan sulfate	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endrin	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endrin aldehyde	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Endrin ketone	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Gamma-BHC (Lindane)	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
gamma-Chlordane	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Heptachlor	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Heptachlor epoxide	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Methoxychlor	PEST	1.33	UD	1.33	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33	1.32	UD	1.32
Toxaphene	PEST	19.9	UD	19.9	19.8	UD	19.8	20.1	UD	20.1	20	UD	20	19.8	UD	19.8

Attachment	1	Sheet No.	54 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-4 - J19YF7			OB-6 - J19YF9			OB-7 - J19YH0			OB-8 - J19YH1			OB-8 re-sample 1, J1FKL6		
		5/13/10			5/13/10			5/13/10			5/13/10			3/17/11		
		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	3.24	U	3.24	3.34	U	3.34	1720	D	26.8	10	U	10
Acenaphthylene	PAH	3.28	U	3.28	3.24	U	3.24	3.34	U	3.34	26.8	U	26.8	9.3	U	9.3
Anthracene	PAH	3.28	U	3.28	3.24	U	3.24	37.5		3.34	421	D	26.8	3.1	U	3.1
Benzo(a)anthracene	PAH	0.919	J	3.28	4.65		3.24	55.5		3.34	746	D	26.8	18		3.3
Benzo(a)pyrene	PAH	1.44	J	3.28	7.63		3.24	68.8		3.34	729	D	26.8	17		6.6
Benzo(b)fluoranthene	PAH	1.07	J	3.28	9.71		3.24	71.0		3.34	912	D	26.8	18		4.3
Benzo(ghi)perylene	PAH	0.837	J	3.28	9.53		3.24	36.8		3.34	504	D	26.8	7.4	U	7.4
Benzo(k)fluoranthene	PAH	3.28	U	3.28	3.92		3.24	30.4		3.34	410	D	26.8	9.2	J	4.1
Chrysene	PAH	1.46	J	3.28	5.51		3.24	39.9		3.34	408	D	26.8	16	J	5.0
Dibenz[a,h]anthracene	PAH	3.28	U	3.28	1.43	J	3.24	8.73		3.34	138	D	26.8	11	U	11
Fluoranthene	PAH	6.55		3.28	15.3		3.24	161		3.34	2380	D	26.8	13	U	13
Fluorene	PAH	3.28	U	3.28	3.24	U	3.24	4.38		3.34	236	D	26.8	5.4	U	5.4
Indeno(1,2,3-cd)pyrene	PAH	1.18	J	3.28	7.89		3.24	42.4		3.34	578	D	26.8	14	J	12
Naphthalene	PAH	3.28	U	3.28	3.24	U	3.24	3.34	U	3.34	284	D	26.8	12	U	12
Phenanthrene	PAH	1.61	J	3.28	4.49		3.24	86.9		3.34	1540	D	26.8	15	J	12
Pyrene	PAH	2.38	J	3.28	9.13		3.24	176		3.34	2470	D	26.8	34	J	12
Aroclor-1016	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	2.9	U	2.9
Aroclor-1221	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	8.5	U	8.5
Aroclor-1232	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	2.1	U	2.1
Aroclor-1242	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	4.9	U	4.9
Aroclor-1248	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	4.9	U	4.9
Aroclor-1254	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	2.7	U	2.7
Aroclor-1260	PCB	13.3	U	13.3	13.4	U	13.4	13.3	U	13.3	13.5	U	13.5	2.7	U	2.7
Aldrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.26	U	0.26
Alpha-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.23	U	0.23
alpha-Chlordane	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.34	U	0.34
Beta-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.70	U	0.70
Delta-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.42	U	0.42
4,4'-DDD	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.57	U	0.57
4,4'-DDE	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.45	JX	0.25
4,4'-DDT	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.62	U	0.62
Dieldrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.22	U	0.22
Endosulfan I	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.19	U	0.19
Endosulfan II	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.30	U	0.30
Endosulfan sulfate	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.29	U	0.29
Endrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.32	U	0.32
Endrin aldehyde	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.18	U	0.18
Endrin ketone	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.51	U	0.51
Gamma-BHC (Lindane)	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.49	U	0.49
gamma-Chlordane	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.28	U	0.28
Heptachlor	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.23	U	0.23
Heptachlor epoxide	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.45	U	0.45
Methoxychlor	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	1.35	UD	1.35	0.47	U	0.47
Toxaphene	PEST	20	UD	20	20.1	UD	20.1	20	UD	20	20.2	UD	20.2	17	U	17

Attachment	1	Sheet No.	55 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-9 - J19YH2			OB-10 - J19YH3			OB-11 - J19YH4			OB-12 - J19YH5			OB-13 - J1B4H9		
		5/13/10			5/13/10			5/13/10			5/13/10			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	21.9		3.25	3.32	U	3.32	7.1		3.18	3.36	U	3.36	7.96		3.33
Acenaphthylene	PAH	3.25	U	3.25	3.32	U	3.32	3.18	U	3.18	3.36	U	3.36	3.33	U	3.33
Anthracene	PAH	58.4		3.25	1.88	J	3.32	2.43	J	3.18	1.41	J	3.36	3.33	U	3.33
Benzo(a)anthracene	PAH	94.5		3.25	13.3		3.32	21.3		3.18	13.7		3.36	10.2		3.33
Benzo(a)pyrene	PAH	85.3		3.25	11.9		3.32	57.4		3.18	12.8		3.36	7.41		3.33
Benzo(b)fluoranthene	PAH	84.1		3.25	11.7		3.32	53.5		3.18	17		3.36	15.4		3.33
Benzo(ghi)perylene	PAH	64.5		3.25	9.20		3.32	98.0		3.18	9.28		3.36	4.4		3.33
Benzo(k)fluoranthene	PAH	43.5		3.25	6.08		3.32	22.1		3.18	6.11		3.36	3.4		3.33
Chrysene	PAH	160		3.25	34.1		3.32	17.3		3.18	23.7		3.36	18.7		3.33
Dibenz[a,h]anthracene	PAH	19.0		3.25	2.49	J	3.32	10.8		3.18	1.6	J	3.36	3.33	U	3.33
Fluoranthene	PAH	269		3.25	29.1		3.32	54.6		3.18	29.5		3.36	24.6		3.33
Fluorene	PAH	32.3		3.25	1.36	J	3.32	1.11	J	3.18	3.36	U	3.36	3.33	U	3.33
Indeno(1,2,3-cd)pyrene	PAH	71.3		3.25	12.8		3.32	68.8		3.18	9.37		3.36	8.95		3.33
Naphthalene	PAH	3.25	U	3.25	3.32	U	3.32	3.18	U	3.18	3.36	U	3.36	25.1		3.33
Phenanthrene	PAH	201		3.25	11.3		3.32	14.1		3.18	10.4		3.36	7.35		3.33
Pyrene	PAH	290		3.25	39.6		3.32	51.9		3.18	28.7		3.36	18.3		3.33
Aroclor-1016	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1221	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1232	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1242	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1248	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1254	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aroclor-1260	PCB	13.4	U	13.4	13.2	U	13.2	13.1	U	13.1	13.4	U	13.4	13.3	U	13.3
Aldrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Alpha-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
alpha-Chlordane	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Beta-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Delta-BHC	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
4,4'-DDD	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
4,4'-DDE	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
4,4'-DDT	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Dieldrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endosulfan I	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endosulfan II	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endosulfan sulfate	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endrin	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endrin aldehyde	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Endrin ketone	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Gamma-BHC (Lindane)	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
gamma-Chlordane	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Heptachlor	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Heptachlor epoxide	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Methoxychlor	PEST	1.34	UD	1.34	1.32	UD	1.32	1.32	UD	1.32	1.34	UD	1.34	1.33	UD	1.33
Toxaphene	PEST	20.1	UD	20.1	19.9	UD	19.9	19.8	UD	19.8	20.1	UD	20.1	20	UD	20

Attachment	1	Sheet No.	56 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-14 - J1B4J0			OB-15 - J1B4J1			SPA-4 - J19YJ0			SPA-4 re-sample 1, J1FKM0			Duplicate of J19YJ4 - J19YJ9		
		5/17/10			5/17/10			5/17/10			3/17/11			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.33	U	3.33	3.34	U	3.34	3.34	U	3.34	9.7	U	9.7	39.1		3.35
Acenaphthylene	PAH	3.33	U	3.33	3.34	U	3.34	16.7		3.34	8.7	U	8.7	3.35	U	3.35
Anthracene	PAH	3.33	U	3.33	2.59	J	3.34	3.34	U	3.34	87		3.0	28.4		3.35
Benzo(a)anthracene	PAH	6.98		3.33	22.3		3.34	1.04	J	3.34	230		3.1	128		3.35
Benzo(a)pyrene	PAH	5.72		3.33	18.9		3.34	2.07	J	3.34	170		6.2	142		3.35
Benzo(b)fluoranthene	PAH	8.78		3.33	27.5		3.34	1.81	J	3.34	190		4.1	179		3.35
Benzo(ghi)perylene	PAH	4.07		3.33	11.6		3.34	1.15	J	3.34	96		7.0	90.1		3.35
Benzo(k)fluoranthene	PAH	2.53	J	3.33	7.86		3.34	1	J	3.34	87		3.8	67		3.35
Chrysene	PAH	8.23		3.33	32.5		3.34	3.34	U	3.34	160		4.7	117		3.35
Dibenz[a,h]anthracene	PAH	3.33	U	3.33	1.49	J	3.34	3.34	U	3.34	26	JX	11	19.2		3.35
Fluoranthene	PAH	17.9		3.33	65.9		3.34	6.67		3.34	400		13	333		3.35
Fluorene	PAH	3.33	U	3.33	1.71	J	3.34	3.34	U	3.34	57		5.1	11.9		3.35
Indeno(1,2,3-cd)pyrene	PAH	5.05		3.33	16.5		3.34	1.6	J	3.34	120		12	95.6		3.35
Naphthalene	PAH	3.33	U	3.33	3.34	U	3.34	3.34	U	3.34	12	U	12	3.35	U	3.35
Phenanthrene	PAH	6.48		3.33	26.8		3.34	1.96	J	3.34	240		12	128		3.35
Pyrene	PAH	13.8		3.33	49.6		3.34	1.49	J	3.34	400		12	346		3.35
Aroclor-1016	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	2.9	U	2.9	13.4	U	13.4
Aroclor-1221	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	8.3	U	8.3	13.4	U	13.4
Aroclor-1232	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	2.1	U	2.1	13.4	U	13.4
Aroclor-1242	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	4.8	U	4.8	13.4	U	13.4
Aroclor-1248	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	4.8	U	4.8	13.4	U	13.4
Aroclor-1254	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	2.7	U	2.7	13.4	U	13.4
Aroclor-1260	PCB	13.3	U	13.3	13.3	U	13.3	13.3	U	13.3	2.7	U	2.7	5.26	J	13.4
Aldrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.25	U	0.25	1.34	UD	1.34
Alpha-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.21	U	0.21	1.34	UD	1.34
alpha-Chlordane	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.32	U	0.32	1.34	UD	1.34
Beta-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.66	U	0.66	1.34	UD	1.34
Delta-BHC	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.40	U	0.40	1.34	UD	1.34
4,4'-DDD	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.54	U	0.54	1.34	UD	1.34
4,4'-DDE	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.24	U	0.24	6.74	D	6.74
4,4'-DDT	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.59	U	0.59	1.34	UD	1.34
Dieldrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.21	U	0.21	1.34	UD	1.34
Endosulfan I	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.18	U	0.18	3.02	JD	3.02
Endosulfan II	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.29	U	0.29	1.34	UD	1.34
Endosulfan sulfate	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.28	U	0.28	1.34	UD	1.34
Endrin	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.30	U	0.30	1.34	UD	1.34
Endrin aldehyde	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.17	U	0.17	1.34	UD	1.34
Endrin ketone	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.49	U	0.49	1.34	UD	1.34
Gamma-BHC (Lindane)	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.46	U	0.46	1.34	UD	1.34
gamma-Chlordane	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.27	U	0.27	1.34	UD	1.34
Heptachlor	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.21	U	0.21	1.34	UD	1.34
Heptachlor epoxide	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.42	U	0.42	1.34	UD	1.34
Methoxychlor	PEST	1.33	UD	1.33	1.34	UD	1.34	1.33	UD	1.33	0.45	U	0.45	1.34	UD	1.34
Toxaphene	PEST	20	UD	20	20.1	UD	20.1	20	UD	20	16	U	16	20.1	UD	20.1

Attachment	1	Sheet No.	57 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	Duplicate of J1FKM0 re-sample 1, J1FKM9			SPA-1 - J19YH7			SPA-1 re-sample 1, J1FKL7			SPA-2 - J19YH8			SPA-2 re-sample 1, J1FKL8		
		3/17/11			5/17/10			3/17/11			5/17/10			3/17/11		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.6	U	9.6	6.67	U	6.67	10	U	10	3.33	U	3.33	10	U	10
Acenaphthylene	PAH	8.6	U	8.6	6.67	U	6.67	9.3	U	9.3	34.9		3.33	27	J	9.3
Anthracene	PAH	48		2.9	71.7	D	6.67	3.1	U	3.1	3.33	U	3.33	3.1	U	3.1
Benzo(a)anthracene	PAH	170		3.1	258	D	6.67	3.3	U	3.3	7.26		3.33	3.3	U	3.3
Benzo(a)pyrene	PAH	120		6.2	307	D	6.67	6.6	U	6.6	10.5		3.33	6.8	J	6.6
Benzo(b)fluoranthene	PAH	140		4.0	338	D	6.67	4.3	U	4.3	11.2		3.33	4.3	U	4.3
Benzo(ghi)perylene	PAH	38	X	6.9	186	D	6.67	7.4	U	7.4	12.2		3.33	7.4	U	7.4
Benzo(k)fluoranthene	PAH	69		3.8	145	D	6.67	4.1	U	4.1	6.28		3.33	4.1	U	4.1
Chrysene	PAH	140		4.6	143	D	6.67	5.0	U	5.0	4.05		3.33	5.0	U	5.0
Dibenz[a,h]anthracene	PAH	19	JX	11	39.9	D	6.67	11	U	11	1.5	J	3.33	11	U	11
Fluoranthene	PAH	290		12	731	D	6.67	13	U	13	29.7		3.33	13	U	13
Fluorene	PAH	31		5.1	32.9	D	6.67	5.4	U	5.4	3.33	U	3.33	5.4	U	5.4
Indeno(1,2,3-cd)pyrene	PAH	110		12	211	D	6.67	12	U	12	11.6		3.33	12	U	12
Naphthalene	PAH	12	U	12	6.67	U	6.67	12	U	12	3.33	U	3.33	12	U	12
Phenanthrene	PAH	130		12	247	D	6.67	12	U	12	10.6		3.33	12	U	12
Pyrene	PAH	300		12	790	D	6.67	12	U	12	22		3.33	12	U	12
Aroclor-1016	PCB	2.8	U	2.8	13.4	U	13.4	2.8	U	2.8	13.3	U	13.3	2.6	U	2.6
Aroclor-1221	PCB	8.0	U	8.0	13.4	U	13.4	8.1	U	8.1	13.3	U	13.3	7.6	U	7.6
Aroclor-1232	PCB	2.0	U	2.0	13.4	U	13.4	2.0	U	2.0	13.3	U	13.3	1.9	U	1.9
Aroclor-1242	PCB	4.7	U	4.7	13.4	U	13.4	4.7	U	4.7	13.3	U	13.3	4.4	U	4.4
Aroclor-1248	PCB	4.7	U	4.7	13.4	U	13.4	4.7	U	4.7	13.3	U	13.3	4.4	U	4.4
Aroclor-1254	PCB	2.6	U	2.6	13.4	U	13.4	2.6	U	2.6	13.3	U	13.3	2.5	U	2.5
Aroclor-1260	PCB	2.6	U	2.6	13.4	U	13.4	2.6	U	2.6	13.3	U	13.3	2.5	U	2.5
Aldrin	PEST	0.26	U	0.26	1.34	UD	1.34	0.25	U	0.25	1.33	UD	1.33	0.26	U	0.26
Alpha-BHC	PEST	0.22	U	0.22	1.34	UD	1.34	0.22	U	0.22	1.33	UD	1.33	0.22	U	0.22
alpha-Chlordane	PEST	0.33	U	0.33	1.34	UD	1.34	0.33	U	0.33	1.33	UD	1.33	0.33	U	0.33
Beta-BHC	PEST	0.69	U	0.69	1.34	UD	1.34	0.67	U	0.67	1.33	UD	1.33	0.68	U	0.68
Delta-BHC	PEST	0.41	U	0.41	1.34	UD	1.34	0.40	U	0.40	1.33	UD	1.33	0.41	U	0.41
4,4'-DDD	PEST	0.56	U	0.56	1.34	UD	1.34	0.55	U	0.55	1.33	UD	1.33	0.56	U	0.56
4,4'-DDE	PEST	0.25	U	0.25	1.51	JD	1.51	0.24	U	0.24	1.33	UD	1.33	0.24	U	0.24
4,4'-DDT	PEST	0.61	U	0.61	1.34	UD	1.34	0.59	U	0.59	1.33	UD	1.33	0.60	U	0.60
Dieldrin	PEST	0.22	U	0.22	1.34	UD	1.34	0.21	U	0.21	1.33	UD	1.33	0.21	U	0.21
Endosulfan I	PEST	0.18	U	0.18	1.34	UD	1.34	0.18	U	0.18	1.33	UD	1.33	0.18	U	0.18
Endosulfan II	PEST	0.30	U	0.30	1.34	UD	1.34	0.29	U	0.29	1.33	UD	1.33	0.29	U	0.29
Endosulfan sulfate	PEST	0.29	U	0.29	1.34	UD	1.34	0.28	U	0.28	1.33	UD	1.33	0.28	U	0.28
Endrin	PEST	0.32	U	0.32	1.34	UD	1.34	0.31	U	0.31	1.33	UD	1.33	0.31	U	0.31
Endrin aldehyde	PEST	0.18	U	0.18	1.34	UD	1.34	0.17	U	0.17	1.33	UD	1.33	0.17	U	0.17
Endrin ketone	PEST	0.51	U	0.51	1.34	UD	1.34	0.49	U	0.49	1.33	UD	1.33	0.50	U	0.50
Gamma-BHC (Lindane)	PEST	0.48	U	0.48	1.34	UD	1.34	0.47	U	0.47	1.33	UD	1.33	0.47	U	0.47
gamma-Chlordane	PEST	0.27	U	0.27	1.34	UD	1.34	0.27	U	0.27	1.33	UD	1.33	0.27	U	0.27
Heptachlor	PEST	0.22	U	0.22	1.34	UD	1.34	0.22	U	0.22	1.33	UD	1.33	0.22	U	0.22
Heptachlor epoxide	PEST	0.44	U	0.44	1.34	UD	1.34	0.43	U	0.43	1.33	UD	1.33	0.43	U	0.43
Methoxychlor	PEST	0.46	U	0.46	1.34	UD	1.34	0.45	U	0.45	1.33	UD	1.33	0.46	U	0.46
Toxaphene	PEST	16	U	16	20.1	UD	20.1	16	U	16	19.9	UD	19.9	16	U	16

Attachment	1	Sheet No.	58 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SPA-3 - J19YH9			SPA-3 re-sample 1, J1FKL9			SPA-5 - J19YJ1			SPA-5 re-sample 1, J1FKM1			SPA-6 - J19YJ2		
		5/17/10			3/17/11			5/17/10			3/17/11			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.29	U	3.29	9.7	U	9.7	6.77		3.3	9.7	U	9.7	13.2	U	13.2
Acenaphthylene	PAH	3.29	U	3.29	8.8	U	8.8	85.1		3.3	8.7	U	8.7	53.3	D	13.2
Anthracene	PAH	1.7	J	3.29	3.5	J	3.0	3.3	U	3.3	3.0	U	3.0	62.3	D	13.2
Benzo(a)anthracene	PAH	4.56		3.29	25	X	3.1	14.5		3.3	19		3.1	334	D	13.2
Benzo(a)pyrene	PAH	5.52		3.29	17		6.2	10.4		3.3	22		6.2	380	D	13.2
Benzo(b)fluoranthene	PAH	4.51		3.29	20		4.1	7.95		3.3	25		4.1	366	D	13.2
Benzo(ghi)perylene	PAH	4.04		3.29	7.0	U	7.0	30.9		3.3	7.0	U	7.0	242	D	13.2
Benzo(k)fluoranthene	PAH	2.42	J	3.29	11	JX	3.8	4.23		3.3	9.8	J	3.8	183	D	13.2
Chrysene	PAH	4.91		3.29	27	J	4.7	17.8		3.3	21	J	4.7	339	D	13.2
Dibenz[a,h]anthracene	PAH	3.29	U	3.29	11	U	11	9.3		3.3	11	U	11	49.8	D	13.2
Fluoranthene	PAH	17.7		3.29	45		13	33.5		3.3	17	JX	13	905	D	13.2
Fluorene	PAH	3.29	U	3.29	5.1	U	5.1	3.3	U	3.3	5.1	U	5.1	32.2	D	13.2
Indeno(1,2,3-cd)pyrene	PAH	3.99		3.29	12	J	12	11.2		3.3	16	J	12	252	D	13.2
Naphthalene	PAH	3.29	U	3.29	12	U	12	3.3	U	3.3	12	U	12	13.2	U	13.2
Phenanthrene	PAH	5.73		3.29	13	J	12	12.1		3.3	12	U	12	326	D	13.2
Pyrene	PAH	10.6		3.29	54		12	24.2		3.3	30	J	12	956	D	13.2
Aroclor-1016	PCB	13.4	U	13.4	2.8	U	2.8	13.4	U	13.4	2.8	U	2.8	13.4	U	13.4
Aroclor-1221	PCB	13.4	U	13.4	8.2	U	8.2	13.4	U	13.4	8.1	U	8.1	13.4	U	13.4
Aroclor-1232	PCB	13.4	U	13.4	2.0	U	2.0	13.4	U	13.4	2.0	U	2.0	13.4	U	13.4
Aroclor-1242	PCB	13.4	U	13.4	4.7	U	4.7	13.4	U	13.4	4.7	U	4.7	13.4	U	13.4
Aroclor-1248	PCB	13.4	U	13.4	4.7	U	4.7	13.4	U	13.4	4.7	U	4.7	13.4	U	13.4
Aroclor-1254	PCB	13.4	U	13.4	2.6	U	2.6	13.4	U	13.4	15		2.6	20.8		13.4
Aroclor-1260	PCB	13.4	U	13.4	2.6	U	2.6	13.4	U	13.4	10		2.6	24.8		13.4
Aldrin	PEST	1.34	UD	1.34	0.26	U	0.26	1.34	UD	1.34	0.26	U	0.26	1.34	UD	1.34
Alpha-BHC	PEST	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34
alpha-Chlordane	PEST	1.34	UD	1.34	0.33	U	0.33	1.34	UD	1.34	0.33	U	0.33	1.34	UD	1.34
Beta-BHC	PEST	1.34	UD	1.34	0.69	U	0.69	1.34	UD	1.34	0.69	U	0.69	1.34	UD	1.34
Delta-BHC	PEST	1.34	UD	1.34	0.42	U	0.42	1.34	UD	1.34	0.41	U	0.41	1.34	UD	1.34
4,4'-DDD	PEST	1.34	UD	1.34	0.57	U	0.57	1.34	UD	1.34	0.56	U	0.56	1.34	UD	1.34
4,4'-DDE	PEST	1.34	UD	1.34	0.25	U	0.25	1.34	UD	1.34	14		0.25	268	D	268
4,4'-DDT	PEST	1.34	UD	1.34	0.61	U	0.61	1.34	UD	1.34	5.3		0.61	17.5	D	17.5
Dieldrin	PEST	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34
Endosulfan I	PEST	1.34	UD	1.34	0.18	U	0.18	1.34	UD	1.34	0.18	U	0.18	1.34	UD	1.34
Endosulfan II	PEST	1.34	UD	1.34	0.30	U	0.30	1.34	UD	1.34	0.30	U	0.30	1.34	UD	1.34
Endosulfan sulfate	PEST	1.34	UD	1.34	0.29	U	0.29	1.34	UD	1.34	0.29	U	0.29	1.34	UD	1.34
Endrin	PEST	1.34	UD	1.34	0.32	U	0.32	1.34	UD	1.34	0.32	U	0.32	1.34	UD	1.34
Endrin aldehyde	PEST	1.34	UD	1.34	0.18	U	0.18	1.34	UD	1.34	0.18	U	0.18	1.34	UD	1.34
Endrin ketone	PEST	1.34	UD	1.34	0.51	U	0.51	1.34	UD	1.34	0.51	U	0.51	1.34	UD	1.34
Gamma-BHC (Lindane)	PEST	1.34	UD	1.34	0.48	U	0.48	1.34	UD	1.34	0.48	U	0.48	1.34	UD	1.34
gamma-Chlordane	PEST	1.34	UD	1.34	0.28	U	0.28	1.34	UD	1.34	0.27	U	0.27	1.34	UD	1.34
Heptachlor	PEST	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34	0.22	U	0.22	1.34	UD	1.34
Heptachlor epoxide	PEST	1.34	UD	1.34	0.44	U	0.44	1.34	UD	1.34	0.44	U	0.44	1.34	UD	1.34
Methoxychlor	PEST	1.34	UD	1.34	0.47	U	0.47	1.34	UD	1.34	0.47	U	0.47	1.34	UD	1.34
Toxaphene	PEST	20.1	UD	20.1	16	U	16	20.1	UD	20.1	16	U	16	20.1	UD	20.1

Attachment	1	Sheet No.	59 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SPA-9 - J19YJ5			SPA-9 re-sample 1, J1FKM5			SPA-10 - J19YJ6			SPA-10 re-sample 1, J1FKM6			SPA-11 - J19YJ7		
		5/17/10			3/17/11			5/17/10			3/17/11			5/17/10		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	3.34	U	3.34	11	U	11	3.34	U	3.34	9.8	U	9.8	3.29	U	3.29
Acenaphthylene	PAH	3.34	U	3.34	9.7	U	9.7	3.34	U	3.34	8.8	U	8.8	13		3.29
Anthracene	PAH	4.66		3.34	3.3	U	3.3	4.65		3.34	3.0	U	3.0	6.44		3.29
Benzo(a)anthracene	PAH	61.2		3.34	8.9	J	3.5	68.6		3.34	3.1	U	3.1	57.5		3.29
Benzo(a)pyrene	PAH	64.5		3.34	9.6	J	6.9	75.1		3.34	6.3	U	6.3	72.4		3.29
Benzo(b)fluoranthene	PAH	81.8		3.34	4.5	U	4.5	98.4		3.34	4.1	U	4.1	91.8		3.29
Benzo(ghi)perylene	PAH	46.2		3.34	7.8	U	7.8	54.7		3.34	7.0	U	7.0	50.6		3.29
Benzo(k)fluoranthene	PAH	30		3.34	4.3	U	4.3	37.2		3.34	3.8	U	3.8	32.9		3.29
Chrysene	PAH	101		3.34	8.7	J	5.2	107		3.34	4.7	U	4.7	67.6		3.29
Dibenz[a,h]anthracene	PAH	8.71		3.34	12	U	12	10.6		3.34	11	U	11	8.93		3.29
Fluoranthene	PAH	149		3.34	14	U	14	220		3.34	13	U	13	171		3.29
Fluorene	PAH	2.89	J	3.34	5.7	U	5.7	7.59		3.34	5.2	U	5.2	3.05	J	3.29
Indeno(1,2,3-cd)pyrene	PAH	46.8		3.34	13	U	13	54.5		3.34	12	U	12	52.7		3.29
Naphthalene	PAH	16.4		3.34	13	U	13	7.54		3.34	12	U	12	13.7		3.29
Phenanthrene	PAH	41.7		3.34	13	U	13	65.9		3.34	12	U	12	51.1		3.29
Pyrene	PAH	148		3.34	21	J	13	185		3.34	12	U	12	158		3.29
Aroclor-1016	PCB	13.4	U	13.4	2.9	U	2.9	13.3	U	13.3	2.6	U	2.6	13.4	U	13.4
Aroclor-1221	PCB	13.4	U	13.4	8.5	U	8.5	13.3	U	13.3	7.6	U	7.6	13.4	U	13.4
Aroclor-1232	PCB	13.4	U	13.4	2.1	U	2.1	13.3	U	13.3	1.9	U	1.9	13.4	U	13.4
Aroclor-1242	PCB	13.4	U	13.4	5.0	U	5.0	13.3	U	13.3	4.4	U	4.4	13.4	U	13.4
Aroclor-1248	PCB	13.4	U	13.4	5.0	U	5.0	13.3	U	13.3	4.4	U	4.4	13.4	U	13.4
Aroclor-1254	PCB	13	J	13.4	2.8	U	2.8	16.4		13.3	2.5	U	2.5	13.4	U	13.4
Aroclor-1260	PCB	11.7	J	13.4	2.8	U	2.8	16.8		13.3	2.5	U	2.5	5.37	J	13.4
Aldrin	PEST	1.34	UD	1.34	0.28	U	0.28	1.34	UD	1.34	0.25	U	0.25	1.34	UD	1.34
Alpha-BHC	PEST	1.34	UD	1.34	0.23	U	0.23	1.34	UD	1.34	0.21	U	0.21	1.34	UD	1.34
alpha-Chlordane	PEST	1.34	UD	1.34	0.35	U	0.35	1.34	UD	1.34	0.32	U	0.32	1.34	UD	1.34
Beta-BHC	PEST	1.34	UD	1.34	0.73	U	0.73	1.34	UD	1.34	0.67	U	0.67	1.34	UD	1.34
Delta-BHC	PEST	1.34	UD	1.34	0.44	U	0.44	1.34	UD	1.34	0.40	U	0.40	1.34	UD	1.34
4,4'-DDD	PEST	1.34	UD	1.34	0.60	U	0.60	1.34	UD	1.34	0.55	U	0.55	1.34	UD	1.34
4,4'-DDE	PEST	24.7	D	24.7	0.26	U	0.26	10.3	D	10.3	0.24	U	0.24	4.87	JD	4.87
4,4'-DDT	PEST	2.54	JD	2.54	0.65	U	0.65	1.84	JD	1.84	0.59	U	0.59	1.34	UD	1.34
Dieldrin	PEST	1.34	UD	1.34	0.23	U	0.23	1.34	UD	1.34	0.21	U	0.21	1.34	UD	1.34
Endosulfan I	PEST	1.34	UD	1.34	0.19	U	0.19	4.68	JD	4.68	0.18	U	0.18	1.34	UD	1.34
Endosulfan II	PEST	1.34	UD	1.34	0.31	U	0.31	1.34	UD	1.34	0.29	U	0.29	1.34	UD	1.34
Endosulfan sulfate	PEST	1.34	UD	1.34	0.30	U	0.30	1.34	UD	1.34	0.28	U	0.28	1.34	UD	1.34
Endrin	PEST	1.34	UD	1.34	0.34	U	0.34	1.34	UD	1.34	0.31	U	0.31	1.34	UD	1.34
Endrin aldehyde	PEST	1.34	UD	1.34	0.19	U	0.19	1.34	UD	1.34	0.17	U	0.17	1.34	UD	1.34
Endrin ketone	PEST	1.34	UD	1.34	0.54	U	0.54	1.34	UD	1.34	0.49	U	0.49	1.34	UD	1.34
Gamma-BHC (Lindane)	PEST	1.34	UD	1.34	0.51	U	0.51	1.34	UD	1.34	0.46	U	0.46	1.34	UD	1.34
gamma-Chlordane	PEST	1.34	UD	1.34	0.29	U	0.29	1.34	UD	1.34	0.27	U	0.27	1.34	UD	1.34
Heptachlor	PEST	1.34	UD	1.34	0.23	U	0.23	1.34	UD	1.34	0.21	U	0.21	1.34	UD	1.34
Heptachlor epoxide	PEST	1.34	UD	1.34	0.47	U	0.47	1.34	UD	1.34	0.43	U	0.43	1.34	UD	1.34
Methoxychlor	PEST	1.34	UD	1.34	0.49	U	0.49	1.34	UD	1.34	0.45	U	0.45	1.34	UD	1.34
Toxaphene	PEST	20.1	UD	20.1	17	U	17	20.1	UD	20.1	16	U	16	20.1	UD	20.1

Attachment	1	Sheet No.	61 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SPA-11 re-sample 1, J1FKM7			SPA-12 - J19YJ8			SPA-12 re-sample 1, J1FKM8		
		3/17/11			5/17/10			3/17/11		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	10	U	10	3.34	U	3.34	10	U	10
Acenaphthylene	PAH	9.1	U	9.1	3.34	U	3.34	9.3	U	9.3
Anthracene	PAH	3.1	U	3.1	4.89		3.34	3.2	U	3.2
Benzo(a)anthracene	PAH	3.2	U	3.2	47.8		3.34	44		3.3
Benzo(a)pyrene	PAH	6.5	U	6.5	52.4		3.34	27		6.6
Benzo(b)fluoranthene	PAH	4.3	U	4.3	67.8		3.34	37		4.3
Benzo(ghi)perylene	PAH	7.3	U	7.3	61.3		3.34	7.5	U	7.5
Benzo(k)fluoranthene	PAH	4.0	U	4.0	25.1		3.34	14	J	4.1
Chrysene	PAH	4.9	U	4.9	70.2		3.34	35	J	5.0
Dibenz[a,h]anthracene	PAH	11	U	11	8.69		3.34	11	U	11
Fluoranthene	PAH	13	U	13	139		3.34	13	U	13
Fluorene	PAH	5.4	U	5.4	2.49	J	3.34	5.5	U	5.5
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	56.8		3.34	27	J	12
Naphthalene	PAH	12	U	12	3.34	U	3.34	12	U	12
Phenanthrene	PAH	12	U	12	52		3.34	14	J	12
Pyrene	PAH	12	U	12	123		3.34	65		12
Aroclor-1016	PCB	2.8	U	2.8	13.2	U	13.2	2.8	U	2.8
Aroclor-1221	PCB	8.0	U	8.0	13.2	U	13.2	8.2	U	8.2
Aroclor-1232	PCB	2.0	U	2.0	13.2	U	13.2	2.0	U	2.0
Aroclor-1242	PCB	4.7	U	4.7	13.2	U	13.2	4.7	U	4.7
Aroclor-1248	PCB	4.7	U	4.7	13.2	U	13.2	4.7	U	4.7
Aroclor-1254	PCB	2.6	U	2.6	13.2	U	13.2	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	13.2	U	13.2	2.6	U	2.6
Aldrin	PEST	0.25	U	0.25	1.32	UD	1.32	0.26	U	0.26
Alpha-BHC	PEST	0.21	U	0.21	1.32	UD	1.32	0.22	U	0.22
alpha-Chlordane	PEST	0.32	U	0.32	1.32	UD	1.32	0.34	U	0.34
Beta-BHC	PEST	0.66	U	0.66	1.32	UD	1.32	0.69	U	0.69
Delta-BHC	PEST	0.40	U	0.40	1.32	UD	1.32	0.42	U	0.42
4,4'-DDD	PEST	0.54	U	0.54	1.32	UD	1.32	0.57	U	0.57
4,4'-DDE	PEST	0.24	U	0.24	2.08	JD	2.08	0.33	JX	0.25
4,4'-DDT	PEST	0.58	U	0.58	1.32	UD	1.32	0.61	U	0.61
Dieldrin	PEST	0.21	U	0.21	1.32	UD	1.32	0.22	U	0.22
Endosulfan I	PEST	0.17	U	0.17	1.32	UD	1.32	0.18	U	0.18
Endosulfan II	PEST	0.28	U	0.28	1.32	UD	1.32	0.30	U	0.30
Endosulfan sulfate	PEST	0.27	U	0.27	1.32	UD	1.32	0.29	U	0.29
Endrin	PEST	0.30	U	0.30	1.32	UD	1.32	0.32	U	0.32
Endrin aldehyde	PEST	0.17	U	0.17	1.32	UD	1.32	0.18	U	0.18
Endrin ketone	PEST	0.48	U	0.48	1.32	UD	1.32	0.51	U	0.51
Gamma-BHC (Lindane)	PEST	0.46	U	0.46	1.32	UD	1.32	0.48	U	0.48
gamma-Chlordane	PEST	0.26	U	0.26	1.32	UD	1.32	0.28	U	0.28
Heptachlor	PEST	0.21	U	0.21	1.32	UD	1.32	0.22	U	0.22
Heptachlor epoxide	PEST	0.42	U	0.42	1.32	UD	1.32	0.44	U	0.44
Methoxychlor	PEST	0.45	U	0.45	1.32	UD	1.32	0.47	U	0.47
Toxaphene	PEST	16	U	16	19.8	UD	19.8	16	U	16

Attachment	1	Sheet No.	62 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-5 - J19YF8			Duplicate of J19YF8 - J19YH6			OB-1 - J19YF4			OB-2 - J19YF5			OB-3 - J19YF6		
		5/13/10			5/13/10			5/13/10			5/13/10			5/13/10		
		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	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
1,2-Dichlorobenzene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
1,3-Dichlorobenzene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
1,4-Dichlorobenzene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,4,5-Trichlorophenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,4,6-Trichlorophenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,4-Dichlorophenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,4-Dimethylphenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,4-Dinitrophenol	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
2,4-Dinitrotoluene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2,6-Dinitrotoluene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2-Chloronaphthalene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2-Chlorophenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2-Methylnaphthalene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2-Methylphenol (cresol, o-)	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
2-Nitroaniline	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
2-Nitrophenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
3,3'-Dichlorobenzidine	SVOA	663	U	663	660	U	660	667	U	667	649	U	649	659	U	659
3+4 Methylphenol (cresol, m+p)	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
3-Nitroaniline	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
4,6-Dinitro-2-methylphenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
4-Bromophenylphenyl ether	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
4-Chloro-3-methylphenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
4-Chloroaniline	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
4-Chlorophenylphenyl ether	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
4-Nitroaniline	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
4-Nitrophenol	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
Acenaphthene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Acenaphthylene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Anthracene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Benzo(a)anthracene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Benzo(a)pyrene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Benzo(b)fluoranthene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Benzo(ghi)perylene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Benzo(k)fluoranthene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Bis(2-chloro-1-methylethyl)ether	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Bis(2-Chloroethoxy)methane	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Bis(2-chloroethyl) ether	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Bis(2-ethylhexyl) phthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Butylbenzylphthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Carbazole	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Chrysene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Dibenz[a,h]anthracene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Dibenzofuran	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Diethyl phthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Dimethyl phthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Di-n-butylphthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Di-n-octylphthalate	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Fluoranthene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Fluorene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Hexachlorobenzene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Hexachlorobutadiene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Hexachlorocyclopentadiene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Hexachloroethane	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Indeno(1,2,3-cd)pyrene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Isophorone	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Naphthalene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Nitrobenzene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
N-Nitroso-di-n-dipropylamine	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
N-Nitrosodiphenylamine	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Pentachlorophenol	SVOA	1660	U	1660	1650	U	1650	1670	U	1670	1620	U	1620	1650	U	1650
Phenanthrene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Phenol	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330
Pyrene	SVOA	331	U	331	330	U	330	333	U	333	324	U	324	330	U	330

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-4 - J19YF7			OB-6 - J19YF9			OB-7 - J19YH0			OB-8 - J19YH1			OB-8 re-sample 1, J1FKL6		
		5/13/10			5/13/10			5/13/10			5/13/10			3/17/11		
		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	331	U	331	329	U	329	323	U	323	330	U	330	29	U	29
1,2-Dichlorobenzene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	23	U	23
1,3-Dichlorobenzene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	13	U	13
1,4-Dichlorobenzene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	14	U	14
2,4,5-Trichlorophenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
2,4,6-Trichlorophenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
2,4-Dichlorophenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
2,4-Dimethylphenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	69	U	69
2,4-Dinitrophenol	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	350	U	350
2,4-Dinitrotoluene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	69	U	69
2,6-Dinitrotoluene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	29	U	29
2-Chloronaphthalene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
2-Chlorophenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	22	U	22
2-Methylnaphthalene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	20	U	20
2-Methylphenol (cresol, o-)	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	14	U	14
2-Nitroaniline	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	52	U	52
2-Nitrophenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
3,3'-Dichlorobenzidine	SVOA	662	U	662	658	U	658	647	U	647	660	U	660	94	U	94
3+4 Methylphenol (cresol, m+p)	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	34	U	34
3-Nitroaniline	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	76	U	76
4,6-Dinitro-2-methylphenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	340	U	340
4-Bromophenylphenyl ether	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	20	U	20
4-Chloro-3-methylphenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	69	U	69
4-Chloroaniline	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	85	U	85
4-Chlorophenylphenyl ether	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	22	U	22
4-Nitroaniline	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	76	U	76
4-Nitrophenol	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	100	U	100
Acenaphthene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	11	U	11
Acenaphthylene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	18	U	18
Anthracene	SVOA	331	U	331	329	U	329	323	U	323	191	J	330	18	U	18
Benzo(a)anthracene	SVOA	331	U	331	329	U	329	323	U	323	636		330	21	U	21
Benzo(a)pyrene	SVOA	331	U	331	329	U	329	323	U	323	558		330	71	J	21
Benzo(b)fluoranthene	SVOA	331	U	331	329	U	329	323	U	323	485		330	30	JX	27
Benzo(ghi)perylene	SVOA	331	U	331	329	U	329	323	U	323	411		330	17	U	17
Benzo(k)fluoranthene	SVOA	331	U	331	329	U	329	323	U	323	516		330	42	UX	42
Bis(2-chloro-1-methylethyl)ether	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	24	U	24
Bis(2-chloroethyl) ether	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	120	JB	48
Butylbenzylphthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	45	U	45
Carbazole	SVOA	331	U	331	329	U	329	323	U	323	95.9	J	330	38	U	38
Chrysene	SVOA	331	U	331	329	U	329	323	U	323	611		330	28	U	28
Dibenz[a,h]anthracene	SVOA	331	U	331	329	U	329	323	U	323	138	J	330	20	U	20
Dibenzofuran	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	21	U	21
Diethyl phthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	27	U	27
Dimethyl phthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	24	U	24
Di-n-butylphthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	30	U	30
Di-n-octylphthalate	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	15	U	15
Fluoranthene	SVOA	331	U	331	329	U	329	323	U	323	1170		330	38	U	38
Fluorene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	19	U	19
Hexachlorobenzene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	30	U	30
Hexachlorobutadiene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	10	U	10
Hexachlorocyclopentadiene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	52	U	52
Hexachloroethane	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	331	U	331	329	U	329	323	U	323	376		330	65	J	23
Isophorone	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	18	U	18
Naphthalene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	32	U	32
Nitrobenzene	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	32	U	32
N-Nitrosodiphenylamine	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	22	U	22
Pentachlorophenol	SVOA	1650	U	1650	1640	U	1640	1620	U	1620	1650	U	1650	340	U	340
Phenanthrene	SVOA	331	U	331	329	U	329	323	U	323	579		330	18	U	18
Phenol	SVOA	331	U	331	329	U	329	323	U	323	330	U	330	19	U	19
Pyrene	SVOA	331	U	331	329	U	329	323	U	323	933		330	25	J	13

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-9 - J19YH2			OB-10 - J19YH3			OB-11 - J19YH4			OB-12 - J19YH5			OB-13 - J1B4H9		
		5/13/10			5/13/10			5/13/10			5/13/10			5/17/10		
		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	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
1,2-Dichlorobenzene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
1,3-Dichlorobenzene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
1,4-Dichlorobenzene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,4,5-Trichlorophenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,4,6-Trichlorophenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,4-Dichlorophenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,4-Dimethylphenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,4-Dinitrophenol	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
2,4-Dinitrotoluene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2,6-Dinitrotoluene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2-Chloronaphthalene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2-Chlorophenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2-Methylnaphthalene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2-Methylphenol (cresol, o-)	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
2-Nitroaniline	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
2-Nitrophenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
3,3'-Dichlorobenzidine	SVOA	663	U	663	663	U	663	665	U	665	657	U	657	662	U	662
3+4 Methylphenol (cresol, m+p)	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
3-Nitroaniline	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
4,6-Dinitro-2-methylphenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
4-Bromophenylphenyl ether	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
4-Chloro-3-methylphenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
4-Chloroaniline	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
4-Chlorophenylphenyl ether	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
4-Nitroaniline	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
4-Nitrophenol	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
Acenaphthene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Acenaphthylene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Anthracene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Benzo(a)anthracene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Benzo(a)pyrene	SVOA	331	U	331	331	U	331	57.4	J	333	328	U	328	331	U	331
Benzo(b)fluoranthene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Benzo(ghi)perylene	SVOA	331	U	331	331	U	331	102	J	102	328	U	328	331	U	331
Benzo(k)fluoranthene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Bis(2-chloro-1-methylethyl)ether	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Bis(2-Chloroethoxy)methane	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Bis(2-chloroethyl) ether	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Bis(2-ethylhexyl) phthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Butylbenzylphthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Carbazole	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Chrysene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Dibenz[a,h]anthracene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Dibenzofuran	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Diethyl phthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Dimethyl phthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Di-n-butylphthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Di-n-octylphthalate	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Fluoranthene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Fluorene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Hexachlorobenzene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Hexachlorobutadiene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Hexachlorocyclopentadiene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Hexachloroethane	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Indeno(1,2,3-cd)pyrene	SVOA	331	U	331	331	U	331	56	J	333	328	U	328	331	U	331
Isophorone	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Naphthalene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Nitrobenzene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
N-Nitroso-di-n-dipropylamine	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
N-Nitrosodiphenylamine	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Pentachlorophenol	SVOA	1660	U	1660	1660	U	1660	1660	U	1660	1640	U	1640	1660	U	1660
Phenanthrene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Phenol	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331
Pyrene	SVOA	331	U	331	331	U	331	333	U	333	328	U	328	331	U	331

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	OB-14 - J1B4J0			OB-15 - J1B4J1			SPA-4 - J19YJ0			SPA-4 re-sample 1, J1FKM0			Duplicate of J19YJ4 - J19YJ9		
		5/17/10			5/17/10			5/17/10			3/17/11			5/17/10		
		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	328	U	328	331	U	331	325	U	325	28	U	28	658	UD	658
1,2-Dichlorobenzene	SVOA	328	U	328	331	U	331	325	U	325	22	U	22	658	UD	658
1,3-Dichlorobenzene	SVOA	328	U	328	331	U	331	325	U	325	12	U	12	658	UD	658
1,4-Dichlorobenzene	SVOA	328	U	328	331	U	331	325	U	325	14	U	14	658	UD	658
2,4,5-Trichlorophenol	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
2,4,6-Trichlorophenol	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
2,4-Dichlorophenol	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
2,4-Dimethylphenol	SVOA	328	U	328	331	U	331	325	U	325	66	U	66	658	UD	658
2,4-Dinitrophenol	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	330	U	330	3290	UD	3290
2,4-Dinitrotoluene	SVOA	328	U	328	331	U	331	325	U	325	66	U	66	658	UD	658
2,6-Dinitrotoluene	SVOA	328	U	328	331	U	331	325	U	325	28	U	28	658	UD	658
2-Chloronaphthalene	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
2-Chlorophenol	SVOA	328	U	328	331	U	331	325	U	325	21	U	21	658	UD	658
2-Methylnaphthalene	SVOA	328	U	328	331	U	331	325	U	325	19	U	19	658	UD	658
2-Methylphenol (cresol, o-)	SVOA	328	U	328	331	U	331	325	U	325	13	U	13	658	UD	658
2-Nitroaniline	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	50	U	50	3290	UD	3290
2-Nitrophenol	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
3,3'-Dichlorobenzidine	SVOA	657	U	657	663	U	663	650	U	650	90	U	90	1320	UD	1320
3+4 Methylphenol (cresol, m+p)	SVOA	328	U	328	331	U	331	325	U	325	33	U	33	658	UD	658
3-Nitroaniline	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	73	U	73	3290	UD	3290
4,6-Dinitro-2-methylphenol	SVOA	328	U	328	331	U	331	325	U	325	330	U	330	658	UD	658
4-Bromophenylphenyl ether	SVOA	328	U	328	331	U	331	325	U	325	19	U	19	658	UD	658
4-Chloro-3-methylphenol	SVOA	328	U	328	331	U	331	325	U	325	66	U	66	658	UD	658
4-Chloroaniline	SVOA	328	U	328	331	U	331	325	U	325	82	U	82	658	UD	658
4-Chlorophenylphenyl ether	SVOA	328	U	328	331	U	331	325	U	325	21	U	21	658	UD	658
4-Nitroaniline	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	72	U	72	3290	UD	3290
4-Nitrophenol	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	97	U	97	3290	UD	3290
Acenaphthene	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	231	JD	658
Acenaphthylene	SVOA	328	U	328	331	U	331	325	U	325	17	U	17	658	UD	658
Anthracene	SVOA	328	U	328	331	U	331	325	U	325	17	U	17	501	JD	658
Benzo(a)anthracene	SVOA	328	U	328	331	U	331	325	U	325	71	J	20	1450	D	658
Benzo(a)pyrene	SVOA	328	U	328	331	U	331	325	U	325	110	J	20	1310	D	658
Benzo(b)fluoranthene	SVOA	328	U	328	331	U	331	325	U	325	120	JX	26	1190	D	658
Benzo(ghi)perylene	SVOA	328	U	328	331	U	331	325	U	325	41	J	16	906	D	658
Benzo(k)fluoranthene	SVOA	328	U	328	331	U	331	325	U	325	40	UX	40	1240	D	658
Bis(2-chloro-1-methylethyl)ether	SVOA	328	U	328	331	U	331	325	U	325	23	U	23	658	UD	658
Bis(2-Chloroethoxy)methane	SVOA	328	U	328	331	U	331	325	U	325	23	U	23	658	UD	658
Bis(2-chloroethyl) ether	SVOA	328	U	328	331	U	331	325	U	325	17	U	17	658	UD	658
Bis(2-ethylhexyl) phthalate	SVOA	328	U	328	331	U	331	325	U	325	110	JB	46	658	UD	658
Butylbenzylphthalate	SVOA	328	U	328	331	U	331	325	U	325	43	U	43	658	UD	658
Carbazole	SVOA	328	U	328	331	U	331	325	U	325	36	U	36	267	JD	658
Chrysene	SVOA	328	U	328	331	U	331	325	U	325	66	J	27	1440	D	658
Dibenz[a,h]anthracene	SVOA	328	U	328	331	U	331	325	U	325	19	U	19	313	JD	658
Dibenzofuran	SVOA	328	U	328	331	U	331	325	U	325	20	U	20	112	JD	658
Diethyl phthalate	SVOA	328	U	328	331	U	331	325	U	325	26	U	26	658	UD	658
Dimethyl phthalate	SVOA	328	U	328	331	U	331	325	U	325	23	U	23	658	UD	658
Di-n-butylphthalate	SVOA	328	U	328	331	U	331	325	U	325	29	U	29	658	UD	658
Di-n-octylphthalate	SVOA	328	U	328	331	U	331	325	U	325	14	U	14	658	UD	658
Fluoranthene	SVOA	328	U	328	331	U	331	325	U	325	120	J	36	3120	D	658
Fluorene	SVOA	328	U	328	331	U	331	325	U	325	18	U	18	177	JD	658
Hexachlorobenzene	SVOA	328	U	328	331	U	331	325	U	325	29	U	29	658	UD	658
Hexachlorobutadiene	SVOA	328	U	328	331	U	331	325	U	325	10	U	10	658	UD	658
Hexachlorocyclopentadiene	SVOA	328	U	328	331	U	331	325	U	325	50	U	50	658	UD	658
Hexachloroethane	SVOA	328	U	328	331	U	331	325	U	325	21	U	21	658	UD	658
Indeno(1,2,3-cd)pyrene	SVOA	328	U	328	331	U	331	325	U	325	83	J	22	805	D	658
Isophorone	SVOA	328	U	328	331	U	331	325	U	325	17	U	17	658	UD	658
Naphthalene	SVOA	328	U	328	331	U	331	325	U	325	31	U	31	658	UD	658
Nitrobenzene	SVOA	328	U	328	331	U	331	325	U	325	22	U	22	658	UD	658
N-Nitroso-di-n-dipropylamine	SVOA	328	U	328	331	U	331	325	U	325	31	U	31	658	UD	658
N-Nitrosodiphenylamine	SVOA	328	U	328	331	U	331	325	U	325	21	U	21	658	UD	658
Pentachlorophenol	SVOA	1640	U	1640	1660	U	1660	1630	U	1630	330	U	330	3290	UD	3290
Phenanthrene	SVOA	328	U	328	331	U	331	325	U	325	44	J	17	2110	D	658
Phenol	SVOA	328	U	328	331	U	331	325	U	325	18	U	18	658	UD	658
Pyrene	SVOA	328	U	328	331	U	331	325	U	325	110	J	12	2190	D	658

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	Duplicate of J1FKM0 re-sample 1, J1FKM9			SPA-1 - J19YH7			SPA-1 re-sample 1, J1FKL7			SPA-2 - J19YH8			SPA-2 re-sample 1, J1FKL8		
		3/17/11			5/17/10			3/17/11			5/17/10			3/17/11		
		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	28	U	28	327	U	327	28	U	28	331	U	331	27	U	27
1,2-Dichlorobenzene	SVOA	22	U	22	327	U	327	22	U	22	331	U	331	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	327	U	327	12	U	12	331	U	331	12	U	12
1,4-Dichlorobenzene	SVOA	14	U	14	327	U	327	14	U	14	331	U	331	13	U	13
2,4,5-Trichlorophenol	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
2,4,6-Trichlorophenol	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
2,4-Dichlorophenol	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
2,4-Dimethylphenol	SVOA	67	U	67	327	U	327	66	U	66	331	U	331	63	U	63
2,4-Dinitrophenol	SVOA	340	U	340	1640	U	1640	330	U	330	1650	U	1650	320	U	320
2,4-Dinitrotoluene	SVOA	67	U	67	327	U	327	66	U	66	331	U	331	63	U	63
2,6-Dinitrotoluene	SVOA	28	U	28	327	U	327	28	U	28	331	U	331	27	U	27
2-Chloronaphthalene	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
2-Chlorophenol	SVOA	21	U	21	327	U	327	21	U	21	331	U	331	20	U	20
2-Methylnaphthalene	SVOA	19	U	19	327	U	327	19	U	19	331	U	331	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	327	U	327	13	U	13	331	U	331	12	U	12
2-Nitroaniline	SVOA	50	U	50	1640	U	1640	50	U	50	1650	U	1650	48	U	48
2-Nitrophenol	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
3,3'-Dichlorobenzidine	SVOA	91	U	91	655	U	655	90	U	90	662	U	662	87	U	87
3+4 Methylphenol (cresol, m+p)	SVOA	33	U	33	327	U	327	33	U	33	331	U	331	32	U	32
3-Nitroaniline	SVOA	74	U	74	1640	U	1640	73	U	73	1650	U	1650	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	330	U	330	327	U	327	330	U	330	331	U	331	320	U	320
4-Bromophenylphenyl ether	SVOA	19	U	19	327	U	327	19	U	19	331	U	331	18	U	18
4-Chloro-3-methylphenol	SVOA	67	U	67	327	U	327	66	U	66	331	U	331	63	U	63
4-Chloroaniline	SVOA	83	U	83	327	U	327	82	U	82	331	U	331	79	U	79
4-Chlorophenylphenyl ether	SVOA	21	U	21	327	U	327	21	U	21	331	U	331	20	U	20
4-Nitroaniline	SVOA	73	U	73	1640	U	1640	73	U	73	1650	U	1650	70	U	70
4-Nitrophenol	SVOA	98	U	98	1640	U	1640	97	U	97	1650	U	1650	93	U	93
Acenaphthene	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.9	U	9.9
Acenaphthylene	SVOA	17	U	17	327	U	327	17	U	17	331	U	331	16	U	16
Anthracene	SVOA	19	J	17	89.6	J	327	17	U	17	331	U	331	16	U	16
Benzo(a)anthracene	SVOA	130	J	20	435		327	20	U	20	331	U	331	19	U	19
Benzo(a)pyrene	SVOA	150	J	20	400		327	20	U	20	331	U	331	19	U	19
Benzo(b)fluoranthene	SVOA	210	JX	26	369		327	26	U	26	331	U	331	25	U	25
Benzo(ghi)perylene	SVOA	68	J	16	237	J	327	16	U	16	331	U	331	15	U	15
Benzo(k)fluoranthene	SVOA	40	UX	40	382		327	40	U	40	331	U	331	38	U	38
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	327	U	327	23	U	23	331	U	331	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	327	U	327	23	U	23	331	U	331	22	U	22
Bis(2-chloroethyl) ether	SVOA	17	U	17	327	U	327	17	U	17	331	U	331	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	110	JB	46	327	U	327	110	JB	46	273	J	331	110	JB	44
Butylbenzylphthalate	SVOA	43	U	43	327	U	327	43	U	43	331	U	331	41	U	41
Carbazole	SVOA	36	U	36	327	U	327	36	U	36	331	U	331	35	U	35
Chrysene	SVOA	120	J	27	441		327	27	U	27	331	U	331	26	U	26
Dibenz[a,h]anthracene	SVOA	19	U	19	96.2	J	327	19	U	19	331	U	331	18	U	18
Dibenzofuran	SVOA	20	U	20	327	U	327	20	U	20	331	U	331	19	U	19
Diethyl phthalate	SVOA	26	U	26	327	U	327	26	U	26	331	U	331	25	U	25
Dimethyl phthalate	SVOA	23	U	23	327	U	327	23	U	23	331	U	331	22	U	22
Di-n-butylphthalate	SVOA	29	U	29	327	U	327	29	U	29	331	U	331	28	U	28
Di-n-octylphthalate	SVOA	15	U	15	327	U	327	14	U	14	331	U	331	14	U	14
Fluoranthene	SVOA	210	J	36	816		327	36	U	36	331	U	331	35	U	35
Fluorene	SVOA	18	U	18	327	U	327	18	U	18	331	U	331	17	U	17
Hexachlorobenzene	SVOA	29	U	29	327	U	327	29	U	29	331	U	331	28	U	28
Hexachlorobutadiene	SVOA	10	U	10	327	U	327	10	U	10	331	U	331	9.6	U	9.6
Hexachlorocyclopentadiene	SVOA	50	U	50	327	U	327	50	U	50	331	U	331	48	U	48
Hexachloroethane	SVOA	22	U	22	327	U	327	21	U	21	331	U	331	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	110	J	22	243	J	327	22	U	22	331	U	331	21	U	21
Isophorone	SVOA	17	U	17	327	U	327	17	U	17	331	U	331	16	U	16
Naphthalene	SVOA	31	U	31	327	U	327	31	U	31	331	U	331	30	U	30
Nitrobenzene	SVOA	22	U	22	327	U	327	22	U	22	331	U	331	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	31	U	31	327	U	327	31	U	31	331	U	331	30	U	30
N-Nitrosodiphenylamine	SVOA	21	U	21	327	U	327	21	U	21	331	U	331	20	U	20
Pentachlorophenol	SVOA	330	U	330	1640	U	1640	330	U	330	1650	U	1650	320	U	320
Phenanthrene	SVOA	62	J	17	318	J	327	17	U	17	331	U	331	16	U	16
Phenol	SVOA	18	U	18	327	U	327	18	U	18	331	U	331	17	U	17
Pyrene	SVOA	190	J	12	637		327	12	U	12	331	U	331	12	U	12

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SPA-3 - J19YH9			SPA-3 re-sample 1, J1FKL9			SPA-5 - J19YJ1			SPA-5 re-sample 1, J1FKM1			SPA-6 - J19YJ2		
		5/17/10			3/17/11			5/17/10			3/17/11			5/17/10		
		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	332	U	332	27	U	27	331	U	331	29	U	29	326	U	326
1,2-Dichlorobenzene	SVOA	332	U	332	22	U	22	331	U	331	23	U	23	326	U	326
1,3-Dichlorobenzene	SVOA	332	U	332	12	U	12	331	U	331	12	U	12	326	U	326
1,4-Dichlorobenzene	SVOA	332	U	332	13	U	13	331	U	331	14	U	14	326	U	326
2,4,5-Trichlorophenol	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
2,4,6-Trichlorophenol	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
2,4-Dichlorophenol	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
2,4-Dimethylphenol	SVOA	332	U	332	65	U	65	331	U	331	68	U	68	326	U	326
2,4-Dinitrophenol	SVOA	1660	U	1660	330	U	330	1650	U	1650	340	U	340	1630	U	1630
2,4-Dinitrotoluene	SVOA	332	U	332	65	U	65	331	U	331	68	U	68	326	U	326
2,6-Dinitrotoluene	SVOA	332	U	332	27	U	27	331	U	331	29	U	29	326	U	326
2-Chloronaphthalene	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
2-Chlorophenol	SVOA	332	U	332	21	U	21	331	U	331	21	U	21	326	U	326
2-Methylnaphthalene	SVOA	332	U	332	19	U	19	331	U	331	19	U	19	326	U	326
2-Methylphenol (cresol, o-)	SVOA	332	U	332	13	U	13	331	U	331	13	U	13	326	U	326
2-Nitroaniline	SVOA	1660	U	1660	49	U	49	1650	U	1650	51	U	51	1630	U	1630
2-Nitrophenol	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
3,3'-Dichlorobenzidine	SVOA	664	U	664	88	U	88	662	U	662	92	U	92	651	U	651
3+4 Methylphenol (cresol, m+p)	SVOA	332	U	332	32	U	32	331	U	331	34	U	34	326	U	326
3-Nitroaniline	SVOA	1660	U	1660	71	U	71	1650	U	1650	75	U	75	1630	U	1630
4,6-Dinitro-2-methylphenol	SVOA	332	U	332	320	U	320	331	U	331	340	U	340	326	U	326
4-Bromophenylphenyl ether	SVOA	332	U	332	19	U	19	331	U	331	19	U	19	326	U	326
4-Chloro-3-methylphenol	SVOA	332	U	332	65	U	65	331	U	331	68	U	68	326	U	326
4-Chloroaniline	SVOA	332	U	332	80	U	80	331	U	331	84	U	84	326	U	326
4-Chlorophenylphenyl ether	SVOA	332	U	332	21	U	21	331	U	331	21	U	21	326	U	326
4-Nitroaniline	SVOA	1660	U	1660	71	U	71	1650	U	1650	74	U	74	1630	U	1630
4-Nitrophenol	SVOA	1660	U	1660	95	U	95	1650	U	1650	99	U	99	1630	U	1630
Acenaphthene	SVOA	332	U	332	15	J	10	331	U	331	11	U	11	326	U	326
Acenaphthylene	SVOA	332	U	332	17	U	17	331	U	331	17	U	17	326	U	326
Anthracene	SVOA	332	U	332	31	J	17	331	U	331	17	U	17	326	U	326
Benzo(a)anthracene	SVOA	332	U	332	69	J	20	331	U	331	66	J	20	179	J	326
Benzo(a)pyrene	SVOA	332	U	332	100	J	20	331	U	331	110	J	20	176	J	326
Benzo(b)fluoranthene	SVOA	332	U	332	110	JX	26	331	U	331	120	JX	27	172	J	326
Benzo(ghi)perylene	SVOA	332	U	332	31	J	16	331	U	331	46	J	16	77.4	J	326
Benzo(k)fluoranthene	SVOA	332	U	332	39	UX	39	331	U	331	41	UX	41	180	J	326
Bis(2-chloro-1-methylethyl)ether	SVOA	332	U	332	23	U	23	331	U	331	24	U	24	326	U	326
Bis(2-Chloroethoxy)methane	SVOA	332	U	332	23	U	23	331	U	331	24	U	24	326	U	326
Bis(2-chloroethyl) ether	SVOA	332	U	332	16	U	16	331	U	331	17	U	17	326	U	326
Bis(2-ethylhexyl) phthalate	SVOA	332	U	332	100	JB	45	331	U	331	130	JB	47	326	U	326
Butylbenzylphthalate	SVOA	332	U	332	42	U	42	331	U	331	44	U	44	326	U	326
Carbazole	SVOA	332	U	332	35	U	35	331	U	331	37	U	37	326	U	326
Chrysene	SVOA	332	U	332	69	J	26	331	U	331	63	J	28	194	J	326
Dibenz[a,h]anthracene	SVOA	332	U	332	19	U	19	331	U	331	19	U	19	326	U	326
Dibenzofuran	SVOA	332	U	332	20	U	20	331	U	331	20	U	20	326	U	326
Diethyl phthalate	SVOA	332	U	332	25	U	25	331	U	331	27	U	27	326	U	326
Dimethyl phthalate	SVOA	332	U	332	23	U	23	331	U	331	24	U	24	326	U	326
Di-n-butylphthalate	SVOA	332	U	332	28	U	28	331	U	331	30	U	30	326	U	326
Di-n-octylphthalate	SVOA	332	U	332	14	U	14	331	U	331	15	U	15	326	U	326
Fluoranthene	SVOA	332	U	332	140	J	35	331	U	331	99	J	37	366		326
Fluorene	SVOA	332	U	332	18	U	18	331	U	331	18	U	18	326	U	326
Hexachlorobenzene	SVOA	332	U	332	28	U	28	331	U	331	30	U	30	326	U	326
Hexachlorobutadiene	SVOA	332	U	332	9.8	U	9.8	331	U	331	10	U	10	326	U	326
Hexachlorocyclopentadiene	SVOA	332	U	332	49	U	49	331	U	331	51	U	51	326	U	326
Hexachloroethane	SVOA	332	U	332	21	U	21	331	U	331	22	U	22	326	U	326
Indeno(1,2,3-cd)pyrene	SVOA	332	U	332	75	J	22	331	U	331	91	J	23	83.1	J	326
Isophorone	SVOA	332	U	332	17	U	17	331	U	331	17	U	17	326	U	326
Naphthalene	SVOA	332	U	332	30	U	30	331	U	331	32	U	32	326	U	326
Nitrobenzene	SVOA	332	U	332	22	U	22	331	U	331	23	U	23	326	U	326
N-Nitroso-di-n-dipropylamine	SVOA	332	U	332	30	U	30	331	U	331	32	U	32	326	U	326
N-Nitrosodiphenylamine	SVOA	332	U	332	21	U	21	331	U	331	21	U	21	326	U	326
Pentachlorophenol	SVOA	1660	U	1660	320	U	320	1650	U	1650	340	U	340	1630	U	1630
Phenanthrene	SVOA	332	U	332	110	J	17	331	U	331	33	J	17	171	J	326
Phenol	SVOA	332	U	332	18	U	18	331	U	331	18	U	18	326	U	326
Pyrene	SVOA	332	U	332	120	J	12	331	U	331	92	J	12	309	J	326

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CONSTITUENT	CLASS	SPA-6 re-sample 1, J1FKM2 3/17/11			SPA-7 - J19YJ3 5/17/10			SPA-7 re-sample 1, J1FKM3 3/17/11			SPA-8 - J19YJ4 5/17/10			SPA-8 re-sample 1, J1FKM4 3/17/11		
		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	30	U	30	331	U	331	30	U	30	331	U	331	29	U	29
1,2-Dichlorobenzene	SVOA	23	U	23	331	U	331	24	U	24	331	U	331	23	U	23
1,3-Dichlorobenzene	SVOA	13	U	13	331	U	331	13	U	13	331	U	331	12	U	12
1,4-Dichlorobenzene	SVOA	14	U	14	331	U	331	15	U	15	331	U	331	14	U	14
2,4,5-Trichlorophenol	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
2,4,6-Trichlorophenol	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
2,4-Dichlorophenol	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
2,4-Dimethylphenol	SVOA	70	U	70	331	U	331	71	U	71	331	U	331	68	U	68
2,4-Dinitrophenol	SVOA	350	U	350	1660	U	1660	360	U	360	1660	U	1660	340	U	340
2,4-Dinitrotoluene	SVOA	70	U	70	331	U	331	71	U	71	331	U	331	68	U	68
2,6-Dinitrotoluene	SVOA	30	U	30	331	U	331	30	U	30	331	U	331	29	U	29
2-Chloronaphthalene	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
2-Chlorophenol	SVOA	22	U	22	331	U	331	23	U	23	331	U	331	22	U	22
2-Methylnaphthalene	SVOA	20	U	20	331	U	331	20	U	20	331	U	331	20	U	20
2-Methylphenol (cresol, o-)	SVOA	14	U	14	331	U	331	14	U	14	331	U	331	13	U	13
2-Nitroaniline	SVOA	53	U	53	1660	U	1660	54	U	54	1660	U	1660	52	U	52
2-Nitrophenol	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
3,3'-Dichlorobenzidine	SVOA	95	U	95	663	U	663	97	U	97	663	U	663	93	U	93
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	331	U	331	36	U	36	331	U	331	34	U	34
3-Nitroaniline	SVOA	77	U	77	1660	U	1660	79	U	79	1660	U	1660	75	U	75
4,6-Dinitro-2-methylphenol	SVOA	350	U	350	331	U	331	360	U	360	331	U	331	340	U	340
4-Bromophenylphenyl ether	SVOA	20	U	20	331	U	331	20	U	20	331	U	331	20	U	20
4-Chloro-3-methylphenol	SVOA	70	U	70	331	U	331	71	U	71	331	U	331	68	U	68
4-Chloroaniline	SVOA	87	U	87	331	U	331	88	U	88	331	U	331	84	U	84
4-Chlorophenylphenyl ether	SVOA	22	U	22	331	U	331	23	U	23	331	U	331	22	U	22
4-Nitroaniline	SVOA	77	U	77	1660	U	1660	78	U	78	1660	U	1660	75	U	75
4-Nitrophenol	SVOA	100	U	100	1660	U	1660	100	U	100	1660	U	1660	100	U	100
Acenaphthene	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	11	U	11
Acenaphthylene	SVOA	18	U	18	331	U	331	18	U	18	331	U	331	18	U	18
Anthracene	SVOA	18	U	18	331	U	331	20	J	18	331	U	331	18	U	18
Benzo(a)anthracene	SVOA	29	J	21	70.2	J	331	90	J	22	91.6	J	331	21	U	21
Benzo(a)pyrene	SVOA	85	J	21	66.9	J	331	130	J	22	90.1	J	331	71	J	21
Benzo(b)fluoranthene	SVOA	56	JX	28	62.7	J	331	130	JX	28	88.5	J	331	27	U	27
Benzo(ghi)perylene	SVOA	23	J	17	331	U	331	64	J	17	331	U	331	16	U	16
Benzo(k)fluoranthene	SVOA	42	UX	42	65.8	J	331	43	UX	43	91.5	J	331	41	U	41
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	331	U	331	25	U	25	331	U	331	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	331	U	331	25	U	25	331	U	331	24	U	24
Bis(2-chloroethyl) ether	SVOA	18	U	18	331	U	331	18	U	18	331	U	331	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	130	JB	49	331	U	331	120	JB	49	331	U	331	120	JB	47
Butylbenzylphthalate	SVOA	46	U	46	331	U	331	46	U	46	331	U	331	44	U	44
Carbazole	SVOA	38	U	38	331	U	331	39	U	39	331	U	331	37	U	37
Chrysene	SVOA	29	J	29	77.9	J	331	94	J	29	96.8	J	331	28	U	28
Dibenz[a,h]anthracene	SVOA	20	U	20	331	U	331	20	U	20	331	U	331	20	U	20
Dibenzofuran	SVOA	21	U	21	331	U	331	22	U	22	331	U	331	21	U	21
Diethyl phthalate	SVOA	28	U	28	331	U	331	28	U	28	331	U	331	27	U	27
Dimethyl phthalate	SVOA	24	U	24	331	U	331	25	U	25	331	U	331	24	U	24
Di-n-butylphthalate	SVOA	31	U	31	331	U	331	31	U	31	331	U	331	30	U	30
Di-n-octylphthalate	SVOA	15	U	15	331	U	331	15	U	15	331	U	331	15	U	15
Fluoranthene	SVOA	48	J	38	138	J	331	190	J	39	181	J	331	37	U	37
Fluorene	SVOA	19	U	19	331	U	331	19	U	19	331	U	331	19	U	19
Hexachlorobenzene	SVOA	31	U	31	331	U	331	31	U	31	331	U	331	30	U	30
Hexachlorobutadiene	SVOA	11	U	11	331	U	331	11	U	11	331	U	331	10	U	10
Hexachlorocyclopentadiene	SVOA	53	U	53	331	U	331	54	U	54	331	U	331	52	U	52
Hexachloroethane	SVOA	23	U	23	331	U	331	23	U	23	331	U	331	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	75	J	23	331	U	331	97	J	24	331	U	331	63	J	23
Isophorone	SVOA	18	U	18	331	U	331	18	U	18	331	U	331	18	U	18
Naphthalene	SVOA	33	U	33	331	U	331	33	U	33	331	U	331	32	U	32
Nitrobenzene	SVOA	23	U	23	331	U	331	24	U	24	331	U	331	23	U	23
N-Nitroso-di-n-dipropylamine	SVOA	33	U	33	331	U	331	33	U	33	331	U	331	32	U	32
N-Nitrosodiphenylamine	SVOA	22	U	22	331	U	331	23	U	23	331	U	331	22	U	22
Pentachlorophenol	SVOA	350	U	350	1660	U	1660	360	U	360	1660	U	1660	340	U	340
Phenanthrene	SVOA	23	J	18	64.2	J	331	120	J	18	105	J	331	19	J	18
Phenol	SVOA	19	U	19	331	U	331	19	U	19	331	U	331	19	U	19
Pyrene	SVOA	52	J	13	118	J	331	210	J	13	154	J	331	38	J	12

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CONSTITUENT	CLASS	SPA-9 - J19YJ5			SPA-9 re-sample 1, J1FKM5			SPA-10 - J19YJ6			SPA-10 re-sample 1, J1FKM6			SPA-11 - J19YJ7		
		5/17/10			3/17/11			5/17/10			3/17/11			5/17/10		
		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	30	U	30	330	U	330	28	U	28	330	U	330
1,2-Dichlorobenzene	SVOA	330	U	330	24	U	24	330	U	330	22	U	22	330	U	330
1,3-Dichlorobenzene	SVOA	330	U	330	13	U	13	330	U	330	12	U	12	330	U	330
1,4-Dichlorobenzene	SVOA	330	U	330	15	U	15	330	U	330	14	U	14	330	U	330
2,4,5-Trichlorophenol	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
2,4,6-Trichlorophenol	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
2,4-Dichlorophenol	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
2,4-Dimethylphenol	SVOA	330	U	330	72	U	72	330	U	330	66	U	66	330	U	330
2,4-Dinitrophenol	SVOA	1650	U	1650	360	U	360	1650	U	1650	330	U	330	1650	U	1650
2,4-Dinitrotoluene	SVOA	330	U	330	72	U	72	330	U	330	66	U	66	330	U	330
2,6-Dinitrotoluene	SVOA	330	U	330	30	U	30	330	U	330	28	U	28	330	U	330
2-Chloronaphthalene	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
2-Chlorophenol	SVOA	330	U	330	23	U	23	330	U	330	21	U	21	330	U	330
2-Methylnaphthalene	SVOA	330	U	330	21	U	21	330	U	330	19	U	19	330	U	330
2-Methylphenol (cresol, o-)	SVOA	330	U	330	14	U	14	330	U	330	13	U	13	330	U	330
2-Nitroaniline	SVOA	1650	U	1650	54	U	54	1650	U	1650	50	U	50	1650	U	1650
2-Nitrophenol	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
3,3'-Dichlorobenzidine	SVOA	661	U	661	98	U	98	660	U	660	90	U	90	660	U	660
3+4 Methylphenol (cresol, m+p)	SVOA	330	U	330	36	U	36	330	U	330	33	U	33	330	U	330
3-Nitroaniline	SVOA	1650	U	1650	79	U	79	1650	U	1650	73	U	73	1650	U	1650
4,6-Dinitro-2-methylphenol	SVOA	330	U	330	360	U	360	330	U	330	330	U	330	330	U	330
4-Bromophenylphenyl ether	SVOA	330	U	330	21	U	21	330	U	330	19	U	19	330	U	330
4-Chloro-3-methylphenol	SVOA	330	U	330	72	U	72	330	U	330	66	U	66	330	U	330
4-Chloroaniline	SVOA	330	U	330	89	U	89	330	U	330	82	U	82	330	U	330
4-Chlorophenylphenyl ether	SVOA	330	U	330	23	U	23	330	U	330	21	U	21	330	U	330
4-Nitroaniline	SVOA	1650	U	1650	79	U	79	1650	U	1650	73	U	73	1650	U	1650
4-Nitrophenol	SVOA	1650	U	1650	110	U	110	1650	U	1650	98	U	98	1650	U	1650
Acenaphthene	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
Acenaphthylene	SVOA	330	U	330	18	U	18	330	U	330	17	U	17	330	U	330
Anthracene	SVOA	59.8	J	330	18	U	18	330	U	330	17	U	17	330	U	330
Benzo(a)anthracene	SVOA	283	J	330	22	U	22	84.4	J	330	20	U	20	121	J	330
Benzo(a)pyrene	SVOA	268	J	330	69	J	22	96.3	J	330	20	U	20	123	J	330
Benzo(b)fluoranthene	SVOA	260	J	330	28	U	28	97.3	J	330	26	U	26	119	J	330
Benzo(ghi)perylene	SVOA	115	J	330	17	U	17	330	U	330	16	U	16	54.7	J	330
Benzo(k)fluoranthene	SVOA	269	J	330	43	U	43	93.6	J	330	40	U	40	117	J	330
Bis(2-chloro-1-methylethyl)ether	SVOA	330	U	330	25	U	25	330	U	330	23	U	23	330	U	330
Bis(2-Chloroethoxy)methane	SVOA	330	U	330	25	U	25	330	U	330	23	U	23	330	U	330
Bis(2-chloroethyl) ether	SVOA	330	U	330	18	U	18	330	U	330	17	U	17	330	U	330
Bis(2-ethylhexyl) phthalate	SVOA	330	U	330	120	JB	50	330	U	330	110	JB	46	330	U	330
Butylbenzylphthalate	SVOA	330	U	330	47	U	47	330	U	330	43	U	43	330	U	330
Carbazole	SVOA	330	U	330	39	U	39	330	U	330	36	U	36	330	U	330
Chrysene	SVOA	287	J	330	29	U	29	101	J	330	27	U	27	128	J	330
Dibenz[a,h]anthracene	SVOA	66.2	J	330	21	U	21	330	U	330	19	U	19	330	U	330
Dibenzofuran	SVOA	330	U	330	22	U	22	330	U	330	20	U	20	330	U	330
Diethyl phthalate	SVOA	330	U	330	28	U	28	330	U	330	26	U	26	330	U	330
Dimethyl phthalate	SVOA	330	U	330	25	U	25	330	U	330	23	U	23	330	U	330
Di-n-butylphthalate	SVOA	330	U	330	32	U	32	330	U	330	29	U	29	330	U	330
Di-n-octylphthalate	SVOA	330	U	330	16	U	16	330	U	330	14	U	14	330	U	330
Fluoranthene	SVOA	564		330	39	U	39	179	J	330	36	U	36	238	J	330
Fluorene	SVOA	330	U	330	20	U	20	330	U	330	18	U	18	330	U	330
Hexachlorobenzene	SVOA	330	U	330	32	U	32	330	U	330	29	U	29	330	U	330
Hexachlorobutadiene	SVOA	330	U	330	11	U	11	330	U	330	10	U	10	330	U	330
Hexachlorocyclopentadiene	SVOA	330	U	330	54	U	54	330	U	330	50	U	50	330	U	330
Hexachloroethane	SVOA	330	U	330	23	U	23	330	U	330	21	U	21	330	U	330
Indeno(1,2,3-cd)pyrene	SVOA	129	J	330	64	J	24	330	U	330	22	U	22	59.4	J	330
Isophorone	SVOA	330	U	330	18	U	18	330	U	330	17	U	17	330	U	330
Naphthalene	SVOA	330	U	330	34	U	34	330	U	330	31	U	31	330	U	330
Nitrobenzene	SVOA	330	U	330	24	U	24	330	U	330	22	U	22	330	U	330
N-Nitroso-di-n-dipropylamine	SVOA	330	U	330	34	U	34	330	U	330	31	U	31	330	U	330
N-Nitrosodiphenylamine	SVOA	330	U	330	23	U	23	330	U	330	21	U	21	330	U	330
Pentachlorophenol	SVOA	1650	U	1650	360	U	360	1650	U	1650	330	U	330	1650	U	1650
Phenanthrene	SVOA	240	J	330	18	U	18	73.4	J	330	17	U	17	104	J	330
Phenol	SVOA	330	U	330	20	U	20	330	U	330	18	U	18	330	U	330
Pyrene	SVOA	421		330	18	J	13	151	J	330	12	U	12	194	J	330

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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	SPA-11 re-sample 1, J1FKM7			SPA-12 - J19YJ8			SPA-12 re-sample 1, J1FKM8			Equipment Blank - J19YK0			Equipment Blank re-sample 1, J1FKN0		
		3/17/11			5/17/10			3/17/11			5/17/10			3/17/11		
		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	28	U	28	332	U	332	29	U	29	334	U	334	28	U	28
1,2-Dichlorobenzene	SVOA	22	U	22	332	U	332	23	U	23	334	U	334	22	U	22
1,3-Dichlorobenzene	SVOA	12	U	12	332	U	332	12	U	12	334	U	334	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	332	U	332	14	U	14	334	U	334	14	U	14
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
2,4-Dichlorophenol	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
2,4-Dimethylphenol	SVOA	65	U	65	332	U	332	68	U	68	334	U	334	66	U	66
2,4-Dinitrophenol	SVOA	330	U	330	1660	U	1660	340	U	340	1670	U	1670	330	U	330
2,4-Dinitrotoluene	SVOA	65	U	65	332	U	332	68	U	68	334	U	334	66	U	66
2,6-Dinitrotoluene	SVOA	28	U	28	332	U	332	29	U	29	334	U	334	28	U	28
2-Chloronaphthalene	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
2-Chlorophenol	SVOA	21	U	21	332	U	332	22	U	22	334	U	334	21	U	21
2-Methylnaphthalene	SVOA	19	U	19	332	U	332	19	U	19	334	U	334	19	U	19
2-Methylphenol (cresol, o-)	SVOA	13	U	13	332	U	332	13	U	13	334	U	334	13	U	13
2-Nitroaniline	SVOA	49	U	49	1660	U	1660	51	U	51	1670	U	1670	50	U	50
2-Nitrophenol	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
3,3'-Dichlorobenzidine	SVOA	89	U	89	663	U	663	92	U	92	668	U	668	90	U	90
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	332	U	332	34	U	34	334	U	334	33	U	33
3-Nitroaniline	SVOA	72	U	72	1660	U	1660	75	U	75	1670	U	1670	73	U	73
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	332	U	332	340	U	340	334	U	334	330	U	330
4-Bromophenylphenyl ether	SVOA	19	U	19	332	U	332	19	U	19	334	U	334	19	U	19
4-Chloro-3-methylphenol	SVOA	65	U	65	332	U	332	68	U	68	334	U	334	66	U	66
4-Chloroaniline	SVOA	81	U	81	332	U	332	84	U	84	334	U	334	81	U	81
4-Chlorophenylphenyl ether	SVOA	21	U	21	332	U	332	22	U	22	334	U	334	21	U	21
4-Nitroaniline	SVOA	71	U	71	1660	U	1660	74	U	74	1670	U	1670	72	U	72
4-Nitrophenol	SVOA	95	U	95	1660	U	1660	99	U	99	1670	U	1670	96	U	96
Acenaphthene	SVOA	10	U	10	332	U	332	11	U	11	334	U	334	10	U	10
Acenaphthylene	SVOA	17	U	17	332	U	332	17	U	17	334	U	334	17	U	17
Anthracene	SVOA	17	U	17	332	U	332	17	U	17	334	U	334	17	U	17
Benzo(a)anthracene	SVOA	20	U	20	117	J	332	21	U	21	334	U	334	20	U	20
Benzo(a)pyrene	SVOA	20	U	20	108	J	332	70	J	21	334	U	334	20	U	20
Benzo(b)fluoranthene	SVOA	26	U	26	102	J	332	27	JX	27	334	U	334	26	U	26
Benzo(ghi)perylene	SVOA	16	U	16	117	J	332	16	U	16	334	U	334	16	U	16
Benzo(k)fluoranthene	SVOA	39	U	39	90.8	J	332	41	UX	41	334	U	334	40	U	40
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	332	U	332	24	U	24	334	U	334	23	U	23
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	332	U	332	24	U	24	334	U	334	23	U	23
Bis(2-chloroethyl) ether	SVOA	16	U	16	332	U	332	17	U	17	334	U	334	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	110	JB	45	332	U	332	130	JB	47	334	U	334	120	JB	46
Butylbenzylphthalate	SVOA	42	U	42	332	U	332	44	U	44	334	U	334	43	U	43
Carbazole	SVOA	35	U	35	332	U	332	37	U	37	334	U	334	36	U	36
Chrysene	SVOA	27	U	27	117	J	332	28	U	28	334	U	334	27	U	27
Dibenz[a,h]anthracene	SVOA	19	U	19	332	U	332	19	U	19	334	U	334	19	U	19
Dibenzofuran	SVOA	20	U	20	332	U	332	21	U	21	334	U	334	20	U	20
Diethyl phthalate	SVOA	26	U	26	332	U	332	27	U	27	116	J	334	26	U	26
Dimethyl phthalate	SVOA	23	U	23	332	U	332	24	U	24	334	U	334	23	U	23
Di-n-butylphthalate	SVOA	29	U	29	332	U	332	30	U	30	58.7	J	334	29	U	29
Di-n-octylphthalate	SVOA	14	U	14	332	U	332	15	U	15	334	U	334	14	U	14
Fluoranthene	SVOA	35	U	35	223	J	332	37	U	37	334	U	334	36	U	36
Fluorene	SVOA	18	U	18	332	U	332	18	U	18	334	U	334	18	U	18
Hexachlorobenzene	SVOA	29	U	29	332	U	332	30	U	30	334	U	334	29	U	29
Hexachlorobutadiene	SVOA	9.8	U	9.8	332	U	332	10	U	10	334	U	334	9.9	U	9.9
Hexachlorocyclopentadiene	SVOA	49	U	49	332	U	332	51	U	51	334	U	334	50	U	50
Hexachloroethane	SVOA	21	U	21	332	U	332	22	U	22	334	U	334	21	U	21
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	90.8	J	332	64	J	23	334	U	334	22	U	22
Isophorone	SVOA	17	U	17	332	U	332	17	U	17	334	U	334	17	U	17
Naphthalene	SVOA	31	U	31	332	U	332	32	U	32	334	U	334	31	U	31
Nitrobenzene	SVOA	22	U	22	332	U	332	23	U	23	334	U	334	22	U	22
N-Nitroso-di-n-dipropylamine	SVOA	31	U	31	332	U	332	32	U	32	334	U	334	31	U	31
N-Nitrosodiphenylamine	SVOA	21	U	21	332	U	332	22	U	22	334	U	334	21	U	21
Pentachlorophenol	SVOA	320	U	320	1660	U	1660	340	U	340	1670	U	1670	330	U	330
Phenanthrene	SVOA	17	U	17	111	J	332	17	U	17	334	U	334	17	U	17
Phenol	SVOA	18	U	18	332	U	332	18	U	18	334	U	334	18	U	18
Pyrene	SVOA	12	U	12	172	J	332	28	J	12	334	U	334	12	U	12

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

CONSTITUENT	CLASS	Equipment Blank re-sample 2, J1HH87 4/13/11		
		ug/kg	Q	PQL
1,2,4-Trichlorobenzene	SVOA	27	U	27
1,2-Dichlorobenzene	SVOA	22	U	22
1,3-Dichlorobenzene	SVOA	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8
2,4-Dichlorophenol	SVOA	9.8	U	9.8
2,4-Dimethylphenol	SVOA	65	U	65
2,4-Dinitrophenol	SVOA	330	U	330
2,4-Dinitrotoluene	SVOA	65	U	65
2,6-Dinitrotoluene	SVOA	27	U	27
2-Chloronaphthalene	SVOA	9.8	U	9.8
2-Chlorophenol	SVOA	21	U	21
2-Methylnaphthalene	SVOA	19	U	19
2-Methylphenol (cresol, o-)	SVOA	13	U	13
2-Nitroaniline	SVOA	49	U	49
2-Nitrophenol	SVOA	9.8	U	9.8
3,3'-Dichlorobenzidine	SVOA	88	U	88
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32
3-Nitroaniline	SVOA	72	U	72
4,6-Dinitro-2-methylphenol	SVOA	320	U	320
4-Bromophenylphenyl ether	SVOA	19	U	19
4-Chloro-3-methylphenol	SVOA	65	U	65
4-Chloroaniline	SVOA	80	U	80
4-Chlorophenylphenyl ether	SVOA	21	U	21
4-Nitroaniline	SVOA	71	U	71
4-Nitrophenol	SVOA	95	U	95
Acenaphthene	SVOA	10	U	10
Acenaphthylene	SVOA	17	U	17
Anthracene	SVOA	17	U	17
Benzo(a)anthracene	SVOA	20	U	20
Benzo(a)pyrene	SVOA	20	U	20
Benzo(b)fluoranthene	SVOA	26	U	26
Benzo(ghi)perylene	SVOA	16	U	16
Benzo(k)fluoranthene	SVOA	39	U	39
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23
Bis(2-Chloroethoxy)methane	SVOA	23	U	23
Bis(2-chloroethyl) ether	SVOA	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	71	JB	45
Butylbenzylphthalate	SVOA	42	U	42
Carbazole	SVOA	35	U	35
Chrysene	SVOA	26	U	26
Dibenz[a,h]anthracene	SVOA	19	U	19
Dibenzofuran	SVOA	20	U	20
Diethyl phthalate	SVOA	25	U	25
Dimethyl phthalate	SVOA	23	U	23
Di-n-butylphthalate	SVOA	28	U	28
Di-n-octylphthalate	SVOA	14	U	14
Fluoranthene	SVOA	35	U	35
Fluorene	SVOA	18	U	18
Hexachlorobenzene	SVOA	28	U	28
Hexachlorobutadiene	SVOA	9.8	U	9.8
Hexachlorocyclopentadiene	SVOA	49	U	49
Hexachloroethane	SVOA	21	U	21
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22
Isophorone	SVOA	17	U	17
Naphthalene	SVOA	30	U	30
Nitrobenzene	SVOA	22	U	22
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30
N-Nitrosodiphenylamine	SVOA	21	U	21
Pentachlorophenol	SVOA	320	U	320
Phenanthrene	SVOA	17	U	17
Phenol	SVOA	18	U	18
Pyrene	SVOA	12	U	12

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Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Bromide			Chloride			Fluoride			Nitrogen in Nitrate [b]			Nitrogen in Nitrite [b]		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ-2	J19YB9	5/18/10	2.8	U	2.8	2.8	U	2.8	0.7	B	2.8	0.59	JB	0.63	0.85	UR	0.85
Duplicate of J19YB9	J19YD0	5/18/10	2.5	U	2.5	2.5	U	2.5	0.8	B	2.5	0.84		0.56	0.76	U	0.76
SZ-1	J19YB8	5/18/10	2.6	U	2.6	2.6	U	2.6	0.5	B	2.6	0.84	J	0.59	0.79	UR	0.79
SZ-3	J19YC0	5/18/10	2.2	U	2.2	2.2	U	2.2	0.7	B	2.2	0.18	JB	0.50	0.67	UR	0.67
SZ-4	J19YC1	5/18/10	2.6	U	2.6	2.6	U	2.6	0.8	B	2.6	1.06	J	0.59	0.79	UR	0.79
SZ-5	J19YC2	5/18/10	2.5	U	2.5	2.5	U	2.5	0.4	B	2.5	1.81	J	0.56	0.76	UR	0.76
SZ-6	J19YC3	5/18/10	2.6	U	2.6	2.6	U	2.6	0.4	B	2.6	1.94	J	0.59	0.79	UR	0.79
SZ-7	J19YC4	5/18/10	2.5	U	2.5	2.5	U	2.5	0.9	B	2.5	0.75	J	0.56	0.76	UR	0.76
SZ-8	J19YC5	5/18/10	2.5	U	2.5	2.5	U	2.5	0.9	B	2.5	3.37	J	0.56	0.76	UR	0.76
SZ-9	J19YC6	5/18/10	2.5	U	2.5	2.5	U	2.5	1.2	B	2.5	2.64	J	0.56	0.76	UR	0.76
SZ-9 re-sample 1	J1FKL4	3/16/11	0.41	U	0.41	2.1	B	2.1	1.5	B	0.88	1.1	B	0.34	0.36	U	0.36
SZ-10	J19YC7	5/18/10	2.4	U	2.4	2.4	U	2.4	0.5	B	2.4	2.08	J	0.54	0.73	UR	0.73
SZ-11	J19YC8	5/18/10	2.5	U	2.5	2.5	U	2.5	1.3	B	2.5	0.99		0.56	0.76	U	0.76
SZ-11 re-sample 1	J1FKL5	3/16/11	0.38	U	0.38	2.0	U	2.0	0.81	U	0.81	0.4	B	0.31	0.33	U	0.33
SZ-12	J19YC9	5/18/10	2.3	U	2.3	2.3	U	2.3	2.3	U	2.3	0.77		0.52	0.70	U	0.70
DZ-1	J19YD1	5/18/10	2.3	U	2.3	2.3	U	2.3	0.9	B	2.3	2.78	J	0.52	0.70	UR	0.70
Duplicate of J19YD1	J19YF3	5/18/10	2.4	U	2.4	2.4	U	2.4	1.2	B	2.4	2.64		0.54	0.73	U	0.73
DZ-2	J19YD2	5/18/10	2.2	U	2.2	2.2	U	2.2	0.6	B	2.2	1.02	J	0.50	0.67	UR	0.67
DZ-3	J19YD3	5/18/10	2.4	U	2.4	17.6		2.4	0.7	B	2.4	55.8	JD	2.76	0.40	JB	0.73
DZ-4	J19YD4	5/18/10	2.6	U	2.6	5.1		2.6	0.9	B	2.6	26.7	JD	1.20	0.79	UR	0.79
DZ-5	J19YD5	5/18/10	2.5	U	2.5	2.5	U	2.5	1.7	B	2.5	2.26	J	0.56	0.76	UR	0.76
DZ-6	J19YD6	5/18/10	2.4	U	2.4	2.4	U	2.4	1.0	B	2.4	7.59	J	0.54	0.73	UR	0.73
DZ-7	J19YD7	5/18/10	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6	5.38	J	0.59	0.79	UR	0.79
DZ-8	J19YD8	5/18/10	2.5	U	2.5	2.5	U	2.5	0.6	B	2.5	1.13	J	0.56	0.76	UR	0.76
DZ-9	J19YD9	5/18/10	2.4	U	2.4	2.4	U	2.4	0.3	B	2.4	0.79	J	0.54	0.73	UR	0.73
DZ-10	J19YF0	5/18/10	2.5	U	2.5	2.5	U	2.5	0.4	B	2.5	3.19	J	0.56	0.76	UR	0.76
DZ-11	J19YF1	5/18/10	2.5	U	2.5	2.5	U	2.5	1.1	B	2.5	4.02		0.56	0.76	U	0.76
DZ-12	J19YF2	5/18/10	2.3	U	2.3	2.9		2.3	1.1	B	2.3	5.11		0.52	0.70	U	0.70

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Checked	T. E. Queen	Date	5/17/11
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Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Nitrogen in Nitrite and Nitrate			Phosphorous in phosphate[b]			Sulfate			TPH - diesel range			TPH - motor oil (high boiling)		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SZ-2	J19YB9	5/18/10	0.49		0.22	1.3	J	0.9	2.6	B	2.8	3830	U	3830	11500	UJ	11500
Duplicate of J19YB9	J19YD0	5/18/10	0.62		0.19	4.2		2.5	3.2		2.5	3410	U	3410	10200	U	10200
SZ-1	J19YB8	5/18/10	1.4		0.22	1.9	JB	2.6	3.2		2.6	3490	U	3490	10500	UJ	10500
SZ-3	J19YC0	5/18/10	0.15	B	0.19	9.8	J	2.2	1.9	B	2.2	3310	U	3310	27600	J	9940
SZ-4	J19YC1	5/18/10	0.69		0.22	2.3	JB	2.6	4.6		2.6	3430	U	3430	4760	J	10300
SZ-5	J19YC2	5/18/10	1.17		0.21	3.5	J	2.5	5.4		2.5	3530	U	3530	10600	UJ	10600
SZ-6	J19YC3	5/18/10	1.03		0.22	7.5	J	2.6	10.2		2.6	3350	U	3350	4330	J	10000
SZ-7	J19YC4	5/18/10	0.67		0.20	2.4	JB	2.5	6.2		2.5	3480	U	3480	4900	J	10400
SZ-8	J19YC5	5/18/10	2.43		0.20	6.8	J	2.5	14.3		2.5	3440	U	3440	3850	J	10300
SZ-9	J19YC6	5/18/10	1.82		0.22	3.2	J	2.5	5.7		2.5	3410	U	3410	29900	J	10200
SZ-9 re-sample 1	J1FKL4	3/16/11	0.53	BMN	0.38	1.3	U	1.3	5.8		1.8	2600	J	720			
SZ-10	J19YC7	5/18/10	1.68		0.22	2.8	J	2.4	9.3		2.4	3410	U	3410	4620	J	10200
SZ-11	J19YC8	5/18/10	0.68		0.21	2.1	B	2.5	3.9		2.5	3440	U	3440	6290	J	10300
SZ-11 re-sample 1	J1FKL5	3/16/11	0.37	U	0.37	2.5	BC	1.2	2.1	B	1.7	700	U	700			
SZ-12	J19YC9	5/18/10	0.52		0.19	2.3	U	2.3	2.6		2.3	3420	U	3420	10200	U	10200
DZ-1	J19YD1	5/18/10	1.7		0.21	2.5	J	2.3	7.8		2.3	3400	U	3400	5670	J	10200
Duplicate of J19YD1	J19YF3	5/18/10	1.62		0.22	3.2		2.4	8.4		2.4	3450	U	3450	3480	J	10400
DZ-2	J19YD2	5/18/10	0.66		0.22	1.0	JB	2.2	4.9		2.2	3470	U	3470	10400	UJ	10400
DZ-3	J19YD3	5/18/10	43.4	D	2.12	1.0	JB	2.4	160	JD	12.2	3540	U	3540	10600	UJ	10600
DZ-4	J19YD4	5/18/10	22.7	D	1.03	1.9	JB	2.6	101		2.6	3440	U	3440	10300	UJ	10300
DZ-5	J19YD5	5/18/10	1.4		0.22	4.9	J	2.5	8.1		2.5	3450	U	3450	9290	J	10400
DZ-6	J19YD6	5/18/10	5.36		0.22	2.5	J	2.4	17.6		2.4	3500	U	3500	10500	UJ	10500
DZ-7	J19YD7	5/18/10	5.67		0.23	2.3	JB	2.6	19.2		2.6	3490	U	3490	127000	J	10500
DZ-8	J19YD8	5/18/10	0.79		0.23	2.3	JB	2.5	10.3		2.5	3440	U	3440	4230	J	10300
DZ-9	J19YD9	5/18/10	0.63		0.21	1.7	JB	2.4	5.8		2.4	3460	U	3460	18700	J	10400
DZ-10	J19YF0	5/18/10	2.08		0.21	3.5	J	2.5	11.3		2.5	3460	U	3460	6750	J	10400
DZ-11	J19YF1	5/18/10	2.94		0.22	4.0		2.5	18.6		2.5	3510	U	3510	6760	J	10500
DZ-12	J19YF2	5/18/10	4.37		0.20	2.2	B	2.3	25.3		2.3	3370	U	3370	8670	J	10100

Attachment	1	Sheet No.	74 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	TPH diesel range EXT			Percent Solids			pH Measurement		
			ug/kg	Q	PQL	%	Q	PQL	pH unit	Q	PQL
SZ-2	J19YB9	5/18/10				86.1		0.1			
Duplicate of J19YB9	J19YD0	5/18/10				97.2		0.1			
SZ-1	J19YB8	5/18/10				94.9		0.1			
SZ-3	J19YC0	5/18/10				99.0		0.1			
SZ-4	J19YC1	5/18/10				95.6		0.1			
SZ-5	J19YC2	5/18/10				94.5		0.1			
SZ-6	J19YC3	5/18/10				96.4		0.1			
SZ-7	J19YC4	5/18/10				95.3		0.1			
SZ-8	J19YC5	5/18/10				96.2		0.1			
SZ-9	J19YC6	5/18/10				95.0		0.1			
SZ-9 re-sample 1	J1FKL4	3/16/11	8100		1100				9.34		0.01
SZ-10	J19YC7	5/18/10				97.0		0.1			
SZ-11	J19YC8	5/18/10				96.4		0.1			
SZ-11 re-sample 1	J1FKL5	3/16/11	1200	J	1000				9.44		0.01
SZ-12	J19YC9	5/18/10				97.0		0.1			
DZ-1	J19YD1	5/18/10				95.6		0.1			
Duplicate of J19YD1	J19YF3	5/18/10				96.1		0.1			
DZ-2	J19YD2	5/18/10				94.9		0.1			
DZ-3	J19YD3	5/18/10				93.5		0.1			
DZ-4	J19YD4	5/18/10				94.5		0.1			
DZ-5	J19YD5	5/18/10				94.7		0.1			
DZ-6	J19YD6	5/18/10				94.8		0.1			
DZ-7	J19YD7	5/18/10				94.0		0.1			
DZ-8	J19YD8	5/18/10				94.0		0.1			
DZ-9	J19YD9	5/18/10				95.7		0.1			
DZ-10	J19YF0	5/18/10				95.4		0.1			
DZ-11	J19YF1	5/18/10				94.3		0.1			
DZ-12	J19YF2	5/18/10				97.2		0.1			

Attachment	1	Sheet No.	75 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Bromide			Chloride			Fluoride			Nitrogen in Nitrate [b]			Nitrogen in Nitrite [b]		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-5	J19YF8	5/13/10	2.5	U	2.5	2.5	U	2.5	0.8	B	2.5	0.70		0.56	0.76	U	0.76
Duplicate of J19YF8	J19YH6	5/13/10	2.5	U	2.5	2.5	U	2.5	0.5	B	2.5	0.81		0.56	0.76	U	0.76
OB-1	J19YF4	5/13/10	2.5	U	2.5	20.6		2.5	0.7	B	2.5	0.56	U	0.56	0.76	U	0.76
OB-2	J19YF5	5/13/10	2.3	U	2.3	2.3	U	2.3	0.7	B	2.3	0.52	U	0.52	0.70	U	0.70
OB-3	J19YF6	5/13/10	2.4	U	2.4	2.4	U	2.4	0.7	B	2.4	1.29		0.54	0.73	U	0.73
OB-4	J19YF7	5/13/10	2.2	U	2.2	3.6		2.2	0.6	B	2.2	0.52		0.50	0.67	U	0.67
OB-6	J19YF9	5/13/10	2.3	U	2.3	2.3	U	2.3	0.8	B	2.3	1.60		0.52	0.70	U	0.70
OB-7	J19YH0	5/13/10	2.5	U	2.5	6.9		2.5	0.8	B	2.5	0.56	U	0.56	0.76	U	0.76
OB-8	J19YH1	5/13/10	2.3	U	2.3	2.3	U	2.3	0.9	B	2.3	1.31		0.52	0.70	U	0.70
OB-8 re-sample 1	J1FKL6	3/17/11	0.41	U	0.41	2.8	B	2.1	1.1	B	0.88	0.96	B	0.33	0.36	U	0.36
OB-9	J19YH2	5/13/10	2.4	U	2.4	2.4	U	2.4	0.7	B	2.4	0.52	B	0.54	0.73	U	0.73
OB-10	J19YH3	5/13/10	2.4	U	2.4	2.4	U	2.4	0.6	B	2.4	2.51		0.54	0.73	U	0.73
OB-11	J19YH4	5/13/10	2.5	U	2.5	2.5	U	2.5	1.0	B	2.5	0.90		0.56	0.76	U	0.76
OB-12	J19YH5	5/13/10	2.4	U	2.4	2.4	U	2.4	0.7	B	2.4	0.86		0.54	0.73	U	0.73
OB-13	J1B4H9	5/17/10	2.3	U	2.3	2.3	U	2.3	0.5	B	2.3	5.08		0.52	0.70	U	0.70
OB-14	J1B4J0	5/17/10	2.3	U	2.3	2.3	U	2.3	0.7	B	2.3	3.10		0.52	0.70	U	0.70
OB-15	J1B4J1	5/17/10	2.2	U	2.2	2.2	U	2.2	0.3	B	2.2	3.23		0.50	0.67	U	0.67
SPA-4	J19YJ0	5/17/10	2.3	U	2.3	2.3	U	2.3	1.1	B	2.3	0.25	B	0.52	0.70	U	0.70
SPA-4 re-sample 1	J1FKM0	3/17/11	0.38	U	0.38	1.9	U	1.9	0.81	U	0.81	0.43	B	0.31	0.33	U	0.33
Duplicate of J1FKM0	J1FKM9	3/17/11	0.40	U	0.40	2.0	U	2.0	0.84	U	0.84	0.41	B	0.32	0.34	U	0.34
SPA-1	J19YH7	5/17/10	2.4	U	2.4	2.4	U	2.4	0.6	B	2.4	0.77		0.54	0.73	U	0.73
SPA-1 re-sample 1	J1FKL7	3/17/11	0.39	U	0.39	2.0	U	2.0	0.83	U	0.83	0.35	B	0.32	0.34	U	0.34
SPA-2	J19YH8	5/17/10	2.3	U	2.3	2.3	U	2.3	0.9	B	2.3	0.52	U	0.52	0.70	U	0.70
SPA-2 re-sample 1	J1FKL8	3/17/11	0.39	U	0.39	2.0	U	2.0	0.82	U	0.82	0.36	B	0.31	0.34	U	0.34
SPA-3	J19YH9	5/17/10	2.5	U	2.5	2.5	U	2.5	1.0	B	2.5	0.56	U	0.56	0.76	U	0.76
SPA-3 re-sample 1	J1FKL9	3/17/11	0.40	U	0.40	2.0	U	2.0	0.85	U	0.85	0.36	B	0.32	0.35	U	0.35
SPA-5	J19YJ1	5/17/10	2.3	U	2.3	2.3	U	2.3	0.5	B	2.3	0.52	U	0.52	0.70	U	0.70
SPA-5 re-sample 1	J1FKM1	3/17/11	0.40	U	0.40	9.5		2.0	0.86	U	0.86	40.1		0.33	0.35	U	0.35
SPA-6	J19YJ2	5/17/10	2.4	U	2.4	2.5		2.4	0.8	B	2.4	0.50	B	0.54	0.73	U	0.73
SPA-6 re-sample 1	J1FKM2	3/17/11	0.42	U	0.42	6.4		2.1	0.95	B	0.89	44.8		0.34	0.36	U	0.36
SPA-7	J19YJ3	5/17/10	2.2	U	2.2	2.2	U	2.2	0.6	B	2.2	0.29	B	0.50	0.67	U	0.67
SPA-7 re-sample 1	J1FKM3	3/17/11	0.39	U	0.39	2.0	U	2.0	1.1	B	0.83	0.61	B	0.32	0.34	U	0.34
SPA-8	J19YJ4	5/17/10	2.4	U	2.4	2.4	U	2.4	0.8	B	2.4	0.38	B	0.54	0.73	U	0.73
SPA-8 re-sample 1	J1FKM4	3/17/11	0.41	U	0.41	2.1	U	2.1	1.8	B	0.87	0.94	B	0.33	0.36	U	0.36
SPA-9	J19YJ5	5/17/10	2.4	U	2.4	2.4	U	2.4	0.8	B	2.4	1.27		0.54	0.73	U	0.73
SPA-9 re-sample 1	J1FKM5	3/17/11	0.43	U	0.43	2.2	U	2.2	0.96	B	0.91	0.55	B	0.35	0.37	U	0.37
SPA-10	J19YJ6	5/17/10	2.4	U	2.4	2.4	U	2.4	0.8	B	2.4	0.20	B	0.54	0.73	U	0.73
SPA-10 re-sample 1	J1FKM6	3/17/11	0.39	U	0.39	2.0	U	2.0	0.88	B	0.82	0.41	B	0.31	0.34	U	0.34
SPA-11	J19YJ7	5/17/10	2.4	U	2.4	2.4	U	2.4	0.6	B	2.4	4.38		0.54	0.73	U	0.73
SPA-11 re-sample 1	J1FKM7	3/17/11	0.39	U	0.39	5.0	B	2.0	1.1	B	0.84	1.1	B	0.32	0.34	U	0.34
SPA-12	J19YJ8	5/17/10	2.4	U	2.4	5.6		2.4	0.8	B	2.4	1.22		0.54	0.73	U	0.73
SPA-12 re-sample 1	J1FKM8	3/17/11	0.40	U	0.40	2.0	U	2.0	0.97	B	0.85	0.76	B	0.32	0.35	U	0.35
Duplicate of J19YJ4	J19YJ9	5/17/10	2.2	U	2.2	2.2	U	2.2	0.8	B	2.2	0.29	B	0.50	0.67	U	0.67
Equipment Blank	J19YK0	5/17/10															

Attachment	1	Sheet No.	76 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Nitrogen in Nitrite and Nitrate			Phosphorous in phosphate[b]			Sulfate			TPH - diesel range			TPH - motor oil (high boiling)		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
OB-5	J19YF8	5/13/10	0.66		0.20	2.5	U	2.5	5.6		2.5	3360	U	3360	10100	U	10100
Duplicate of J19YF8	J19YH6	5/13/10	0.75		0.20	1.1	B	2.5	6.2		2.5	3350	U	3350	10000	U	10000
OB-1	J19YF4	5/13/10	0.56		0.20	0.9	B	2.5	2.9		2.5	3350	U	3350	10100	U	10100
OB-2	J19YF5	5/13/10	0.34		0.19	1.0	B	2.3	6.4		2.3	3330	U	3330	9980	U	9980
OB-3	J19YF6	5/13/10	1.41		0.19	1.9	B	2.4	6.6		2.4	3340	U	3340	10000	U	10000
OB-4	J19YF7	5/13/10	0.55		0.20	0.9	B	2.2	4.3		2.2	3360	U	3360	10100	U	10100
OB-6	J19YF9	5/13/10	1.25		0.21	3.4		2.3	14.2		2.3	3330	U	3330	5970	J	10000
OB-7	J19YH0	5/13/10	1.3		0.18	2.2	B	2.5	8.8		2.5	3300	U	3300	9900	U	9900
OB-8	J19YH1	5/13/10	1.28		0.19	2.6		2.3	6.7		2.3	4770		3360	8510	J	10100
OB-8 re-sample 1	J1FKL6	3/17/11	0.79	B	0.38	1.3	U	1.3	6.9		1.8	3200	J	720			
OB-9	J19YH2	5/13/10	0.66		0.19	2.4	U	2.4	3.0		2.4	3340	U	3340	10000	U	10000
OB-10	J19YH3	5/13/10	2.49		0.19	1.3	B	2.4	7.7		2.4	3340	U	3340	10000	U	10000
OB-11	J19YH4	5/13/10	0.99		0.18	3.9		2.5	7.4		2.5	3340	U	3340	15000		10000
OB-12	J19YH5	5/13/10	0.95		0.22	2.4		2.4	3.8		2.4	3340	U	3340	10000	U	10000
OB-13	J1B4H9	5/17/10	4.61		0.20	4.4		2.3	6.4		2.3	3360	U	3360	11500		10100
OB-14	J1B4J0	5/17/10	3.01		0.20	4.3		2.3	5.4		2.3	3310	U	3310	6810	J	9930
OB-15	J1B4J1	5/17/10	2.85		0.19	2.7		2.2	8.0		2.2	3340	U	3340	8950	J	10000
SPA-4	J19YJ0	5/17/10	0.11		0.20	7.2		2.3	3.3		2.3	3300	U	3300	8660	J	9920
SPA-4 re-sample 1	J1FKM0	3/17/11	0.36	U	0.36	1.2	U	1.2	1.7	B	1.7	6900		690			
Duplicate of J1FKM0	J1FKM9	3/17/11	0.37	U	0.37	1.3	U	1.3	1.9	B	1.8	2200	J	690			
SPA-1	J19YH7	5/17/10	1.04		0.20	1.4	B	2.4	2.7		2.4	3300	U	3300	184000		9910
SPA-1 re-sample 1	J1FKL7	3/17/11	0.35	U	0.35	2.5	B	1.2	2.1	B	1.7	690	U	690			
SPA-2	J19YH8	5/17/10	0.20		0.20	4.9		2.3	2.7		2.3	3260	U	3260	17400		9800
SPA-2 re-sample 1	J1FKL8	3/17/11	0.37	U	0.37	1.2	U	1.2	1.7	U	1.7	640	U	640			
SPA-3	J19YH9	5/17/10	0.18		0.19	6.9		2.5	1.7	B	2.5	3350	U	3350	10400		10100
SPA-3 re-sample 1	J1FKL9	3/17/11	0.37	U	0.37	1.3	U	1.3	2.0	B	1.8	690	U	690			
SPA-5	J19YJ1	5/17/10	0.17		0.21	2.0	B	2.3	1.8	B	2.3	3330	U	3330	14900		9990
SPA-5 re-sample 1	J1FKM1	3/17/11	39.9		0.37	1.3	B	1.3	43.6		1.8	11000		710			
SPA-6	J19YJ2	5/17/10	0.60		0.21	17.8		2.4	6.6		2.4	3360	U	3360	141000		10100
SPA-6 re-sample 1	J1FKM2	3/17/11	50.9		0.36	1.9	B	1.3	18.2		1.9	8500		720			
SPA-7	J19YJ3	5/17/10	0.41		0.20	3.4		2.2	2.6		2.2	3320	U	3320	10500		9970
SPA-7 re-sample 1	J1FKM3	3/17/11	0.43	B	0.38	1.7	B	1.3	2.0	B	1.8	9500		720			
SPA-8	J19YJ4	5/17/10	0.48		0.20	12.1		2.4	3.4		2.4	3360	U	3360	40800		10100
SPA-8 re-sample 1	J1FKM4	3/17/11	0.85		0.38	1.3	U	1.3	55.6		1.8	7100		690			
SPA-9	J19YJ5	5/17/10	1.34		0.21	9.6		2.4	3.2		2.4	3350	U	3350	60800		10100
SPA-9 re-sample 1	J1FKM5	3/17/11	0.46	B	0.40	1.8	B	1.4	2.8	B	1.9	4400		740			
SPA-10	J19YJ6	5/17/10	0.26		0.22	8.6		2.4	2.0	B	2.4	3350	U	3350	58900		10000
SPA-10 re-sample 1	J1FKM6	3/17/11	0.36	U	0.36	1.2	U	1.2	5.4		1.7	820	J	690			
SPA-11	J19YJ7	5/17/10	4.01		0.20	9.8		2.4	4.6		2.4	3310	U	3310	39100		9930
SPA-11 re-sample 1	J1FKM7	3/17/11	1.1		0.36	1.3	U	1.3	9.1		1.8	690	U	690			
SPA-12	J19YJ8	5/17/10	1.26		0.20	12.8		2.4	10		2.4	3350	U	3350	53900		10000
SPA-12 re-sample 1	J1FKM8	3/17/11	0.62	B	0.38	1.7	B	1.3	3.3	B	1.8	4000	J	700			
Duplicate of J19YJ4	J19YJ9	5/17/10	0.47		0.21	14.8		2.2	3.2		2.2	3360	U	3360	64900		10100
Equipment Blank	J19YK0	5/17/10															

Attachment	1	Sheet No.	77 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	TPH diesel range EXT			Percent Solids			pH Measurement		
			ug/kg	Q	PQL	%	Q	PQL	pH unit	Q	PQL
OB-5	J19YF8	5/13/10				99.2		0.1			
Duplicate of J19YF8	J19YH6	5/13/10				99.2		0.1			
OB-1	J19YF4	5/13/10				98.9		0.1			
OB-2	J19YF5	5/13/10				99.7		0.1			
OB-3	J19YF6	5/13/10				99.3		0.1			
OB-4	J19YF7	5/13/10				99.2		0.1			
OB-6	J19YF9	5/13/10				99.3		0.1			
OB-7	J19YH0	5/13/10				99.2		0.1			
OB-8	J19YH1	5/13/10				99.0		0.1			
OB-8 re-sample 1	J1FKL6	3/17/11	6500		1100				9.48		0.01
OB-9	J19YH2	5/13/10				99.5		0.1			
OB-10	J19YH3	5/13/10				99.3		0.1			
OB-11	J19YH4	5/13/10				99.2		0.1			
OB-12	J19YH5	5/13/10				99.1		0.1			
OB-13	J1B4H9	5/17/10				99.6		0.1			
OB-14	J1B4J0	5/17/10				99.7		0.1			
OB-15	J1B4J1	5/17/10				99.5		0.1			
SPA-4	J19YJ0	5/17/10				99.5		0.1			
SPA-4 re-sample 1	J1FKM0	3/17/11	15000		1000				9.6		0.01
Duplicate of J1FKM0	J1FKM9	3/17/11	5700		1000				9.55		0.01
SPA-1	J19YH7	5/17/10				99.7		0.1			
SPA-1 re-sample 1	J1FKL7	3/17/11	1000	U	1000				9.58		0.01
SPA-2	J19YH8	5/17/10				99.6		0.1			
SPA-2 re-sample 1	J1FKL8	3/17/11	940	U	940				9.44		0.01
SPA-3	J19YH9	5/17/10				99.4		0.1			
SPA-3 re-sample 1	J1FKL9	3/17/11	1000	U	1000				9.66		0.01
SPA-5	J19YJ1	5/17/10				99.6		0.1			
SPA-5 re-sample 1	J1FKM1	3/17/11	41000		1000				8.87		0.01
SPA-6	J19YJ2	5/17/10				99.1		0.1			
SPA-6 re-sample 1	J1FKM2	3/17/11	30000		1100				8.82		0.01
SPA-7	J19YJ3	5/17/10				99.7		0.1			
SPA-7 re-sample 1	J1FKM3	3/17/11	35000		1100				9.17		0.01
SPA-8	J19YJ4	5/17/10				99.2		0.1			
SPA-8 re-sample 1	J1FKM4	3/17/11	12000		1000				9.26		0.01
SPA-9	J19YJ5	5/17/10				99.5		0.1			
SPA-9 re-sample 1	J1FKM5	3/17/11	7700		1100				9.09		0.01
SPA-10	J19YJ6	5/17/10				99.4		0.1			
SPA-10 re-sample 1	J1FKM6	3/17/11	2100	J	1000				9.45		0.01
SPA-11	J19YJ7	5/17/10				99.0		0.1			
SPA-11 re-sample 1	J1FKM7	3/17/11	1000	U	1000				9.42		0.01
SPA-12	J19YJ8	5/17/10				99.5		0.1			
SPA-12 re-sample 1	J1FKM8	3/17/11	8800		1000				9.31		0.01
Duplicate of J19YJ4	J19YJ9	5/17/10				99.2		0.1			
Equipment Blank	J19YK0	5/17/10				99.0		0.1			

Attachment	1	Sheet No.	78 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Attachment 1. 116-H-5 Waste Site Verification Sample Results.

Sample Location	HEIS Number	Sample Date	Percent moisture (wet sample)		
			%	Q	PQL
DZ-1 re-sample 1	J1FKK1	3/16/11	7.0		0
DZ-2 re-sample 1	J1FKK2	3/16/11	6.8		0
DZ-3 re-sample 1	J1FKK3	3/16/11	17.9		0
DZ-4 re-sample 1	J1FKK4	3/16/11	4.4		0
DZ-5 re-sample 1	J1FKK5	3/16/11	5.2		0
DZ-6 re-sample 1	J1FKK6	3/16/11	3.8		0
DZ-7 re-sample 1	J1FKK7	3/16/11	8.2		0
DZ-8 re-sample 1	J1FKK8	3/16/11	5.7		0
DZ-9 re-sample 1	J1FKK9	3/16/11	3.0		0
DZ-10 re-sample 1	J1FKL0	3/16/11	4.7		0
DZ-11 re-sample 1	J1FKL1	3/16/11	9.0		0
DZ-12 re-sample 1	J1FKL2	3/16/11	6.8		0
Duplicate of J1FKK8	J1FKL3	3/16/11	6.9		0
SZ-9 re-sample 1	J1FKL4	3/16/11	6.5		0
SZ-11 re-sample 1	J1FKL5	3/16/11	3.9		0
OB-8 re-sample 1	J1FKL6	3/17/11	6.3		0
SPA-1 re-sample 1	J1FKL7	3/17/11	3.6		0
SPA-2 re-sample 1	J1FKL8	3/17/11	2.8		0
SPA-3 re-sample 1	J1FKL9	3/17/11	3.9		0
SPA-4 re-sample 1	J1FKM0	3/17/11	3.8		0
SPA-5 re-sample 1	J1FKM1	3/17/11	4.8		0
SPA-6 re-sample 1	J1FKM2	3/17/11	7.2		0
SPA-7 re-sample 1	J1FKM3	3/17/11	7.1		0
SPA-8 re-sample 1	J1FKM4	3/17/11	6.4		0
SPA-9 re-sample 1	J1FKM5	3/17/11	9.8		0
SPA-10 re-sample 1	J1FKM6	3/17/11	3.1		0
SPA-11 re-sample 1	J1FKM7	3/17/11	2.6		0
SPA-12 re-sample 1	J1FKM8	3/17/11	5.9		0
Duplicate of J1FKM0	J1FKM9	3/17/11	3.9		0
Equipment Blank	J1FKN0	3/17/11	0.12		0
DZ-1 re-sample 2	J1HH80	4/13/11	7.0		0
DZ-2 re-sample 2	J1HH81	4/13/11	3.5		0
DZ-3 re-sample 2	J1HH82	4/13/11	1.6		0
DZ-4 re-sample 2	J1HH83	4/13/11	2.7		0
DZ-7 re-sample 2	J1HH84	4/13/11	13.2		0
DZ-8 re-sample 2	J1HH85	4/13/11	3.1		0
Duplicate of J1HH85	J1HH86	4/13/11	3.0		0
Equipment Blank	J1HH87	4/13/11	0.1	U	0

Attachment	1	Sheet No.	79 of 79
Originator	J. D. Skoglie	Date	5/17/11
Checked	T. E. Queen	Date	5/17/11
Calc. No.	0100H-CA-V0164	Rev. No.	0

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-H

Discipline: Environmental Calculation No: 0100H-CA-V0165

Subject: 116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations

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 Summary = 4 Total = 5	J. D. Skoglie	T. E. Queen	B. L. Vedder	D. F. Obenauer	6/22/11

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007)

DE01-437.03

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	5/17/2011	Calc. No.:	0100H-CA-V0165	Rev.:	0
Project:	100-H Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	5/17/2011
Subject:	116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					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 116-H-5 waste site. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) (DOE-RL 2009a), 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, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-96-17, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

2) DOE-RL, 2009b, *100 Area Remedial Action Sampling and Analysis Plan*, DOE/RL-96-22, Rev. 5, 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, 2011, *Remaining Sites Verification Package for the 116-H-5, 1904-H Outfall Structure*, Attachment to Waste Site Reclassification Form 2011-012, 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 2009a).

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 2009a).

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:	5/18/2011	Calc. No.:	0100H-CA-V0165	Rev.:	0
Project:	100-H Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	5/18/2011
Subject:	116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 2 of 4	

METHODOLOGY:

The 116-H-5 waste site is comprised of four decision units for verification sampling, consisting of the shallow zone, deep zone, overburden, and staging pile area. The direct contact hazard quotient and carcinogenic risk calculations for the 116-H-5 waste site were conservatively calculated for the shallow zone, overburden, and staging pile area using the statistical verification soil sample results (WCH 2011). Of the contaminants of potential concern (COPCs) for this site nitrogen in nitrate and nitrite required an HQ and risk calculation because this analyte was detected above the background value. Boron, hexavalent chromium, molybdenum, bis(2-ethylhexyl)phthalate, the detected polycyclic aromatic hydrocarbons, pesticides, and polychlorinated biphenyls require HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Although total petroleum hydrocarbons (diesel range extended) were detected and no background value is available, the risk associated with total petroleum hydrocarbons do not contribute to the cumulative toxicity calculation. Lead was detected above background; however, lead does not have a reference dose for calculation of a hazard quotient because toxic effects of lead are correlated with blood-lead levels rather than exposure levels or daily intake. Additionally, arsenic was detected above background; however, the arsenic standard is not toxicity based. All other site nonradionuclide COPCs were not detected or were quantified below background levels. An example of the HQ and risk calculations is presented below:

1) For example, the maximum value for boron is 2.4 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 3.3×10^{-4}. Comparing this value, and all other individual values, to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation. The sum of the HQ values is 1.2×10^{-2}. 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 maximum value for hexavalent chromium is 0.16 mg/kg, divided by 2.1 mg/kg, and multiplied as indicated, is 7.6×10^{-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 1.0×10^{-6}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this criterion is met.

RESULTS:

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

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	5/18/2011	Calc. No.:	0100H-CA-V0165	Rev.:	0
Project:	100-H Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	5/18/2011
Subject:	116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 3 of 4	

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

Table 1 (2 pages) shows the results of the hazard quotient and excess cancer risk calculations.

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 116-H-5 Waste Site (2 pages).

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					
Arsenic[c]	14.0	20	--	--	--
Boron	2.4	7,200	3.3E-04	--	--
Chromium, hexavalent[d]	0.16	240	6.7E-04	2.1	7.6E-08
Lead[e]	33.4	353	--	--	--
Molybdenum	0.33	400	8.3E-04	--	--
Anions					
Nitrogen in nitrate and nitrite	16.0	128,000	1.3E-04	--	--
Semivolatiles					
Bis(2-ethylhexyl) phthalate	0.121	1,600	7.6E-05	71.4	1.7E-09
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.0219	4,800	4.6E-06	--	--
Acenaphthylene[f]	0.027	4,800	5.6E-06	--	--
Anthracene	0.087	24,000	3.6E-06	--	--
Benzo(a)anthracene	0.0785	--	--	1.37	5.7E-08
Benzo(a)pyrene	0.0885	--	--	0.137	6.5E-07
Benzo(b)fluoranthene	0.105	--	--	1.37	7.7E-08
Benzo(ghi)perylene[f]	0.096	2,400	4.0E-05	--	--
Benzo(k)fluoranthene	0.023	--	--	1.37	1.7E-08
Chrysene	0.113	--	--	13.7	8.2E-09
Dibenz(a,h)anthracene	0.026	--	--	1.37	1.9E-08
Fluoranthene	0.400	3,200	1.3E-04	--	--
Fluorene	0.057	3,200	1.8E-05	--	--
Indeno(1,2,3-cd)pyrene	0.0834	--	--	1.37	6.1E-08
Naphthalene	0.0251	1,600	1.6E-05	--	--
Phenanthrene[f]	0.107	24,000	4.5E-06	--	--
Pyrene	0.342	2,400	1.4E-04	--	--
Pesticides					
DDE, 4,4'-	0.040	--	--	2.94	1.4E-08
DDT, 4,4'-	0.0053	40	1.3E-04	2.94	1.8E-09

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	5/17/2011	Calc. No.:	0100H-CA-V0165	Rev.:	0
Project:	100-H Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	5/17/2011
Subject:	116-H-5 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No.	4 of 4

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 116-H-5 Waste Site (2 pages).

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
Aroclor-1254	0.015	1.6	9.4E-03	0.5	3.0E-08
Aroclor-1260	0.010	--	--	0.5	2.0E-08
Total Petroleum Hydrocarbons					
Diesel Range Extended[g]	19.4	200	--	--	--
Motor oil (high boiling)[g]	147	200	--	--	--
Totals					
Cumulative Hazard Quotient:			**1.2E-02**		
Cumulative Excess Cancer Risk:					**1.0E-06**

[a] = From WCH (2011).

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

[c] = 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 RDR/RAWP (DOE-RL 2009a).

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

[e] = Value for the noncarcinogenic RAG calculated using Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children, EPA/540/R 93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

[f] = Toxicity data for acenaphthylene, benzo(ghi)perylene, and phenanthrene are not available. The cleanup level is based on use of
acenaphthylene surrogate: acenaphthene
benzo(ghi)perylene surrogate: pyrene
phenanthrene surrogate: anthracene

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

-- = not applicable RAG = remedial action goal

CONCLUSION:

The calculations in Table 1 demonstrates that the 116-H-5 waste site meets the requirements for the direct contact hazard quotients and carcinogenic (excess cancer) risk, respectively, as identified in the RDR/RAWP (DOE-RL 2009a) and SAP (DOE-RL 2009b). The direct contact hazard quotients and carcinogenic (excess cancer) risk calculations are for use in the RSVP for this site.

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-H

Discipline: Environmental *Calculation No: 0100H-CA-V0166

Subject: 116-H-5 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	T. E. Queen	B. L. Vedder	D. F. Obenauer	6/22/11

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:	6/1/2011	Calc. No.:	0100H-CA-V0166	Rev.:	0
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	6/1/2011
Subject:	116-H-5 Protection of Groundwater Hazard Quotient and Carcinogenic Risk Calculation					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 116-H-5 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, 2011, *116-H-5 Waste Site Cleanup Verification 95% UCL Calculations*, 0100H-CA-V0164, 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	Date:	6/1/2011	Calc. No.:	0100H-CA-V0166	Rev.:	0
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	6/1/2011
Subject:	116-H-5 Protection of Groundwater Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	2 of 4

METHODOLOGY:

The 116-H-5 waste site was divided into four decision units for the purpose of verification sampling; the deep zone excavation, the shallow zone excavation, the staging pile footprint, and the overburden soil stockpile. Hazard quotient and carcinogenic risk calculations for potential impact to groundwater at the 116-H-5 waste site were conservatively calculated for the entire waste site using the statistical or maximum value for each analyte in all decision units from the 95% UCL calculation (WCH 2011). Boron, hexavalent chromium, molybdenum, nitrogen in nitrate, nitrogen in nitrite, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, and 4,4'-DDD are included because they do not have a Hanford Site-specific or Washington State background value available and their respective distribution coefficient is less than 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 predicted risk to groundwater in 1,000 years. 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. Aroclor-1254 is included in the calculation because its K_d (75.6) does not allow for the exclusion from this site. However, the single detection of aroclor-1254 was in the staging pile area, where only a K_d of 7.2 is required to show protection of groundwater. Therefore, aroclor-1254 is included for completeness, but is not necessary to calculate the groundwater HQ. All other site nonradionuclide COPCs were not detected, or quantified below background levels. Additionally, arsenic, lead, TPH-diesel range, TPH-diesel range EXT, and TPH-motor oil (high boiling) were detected above background; however, the standard for each contaminant is not toxicity based, therefore a groundwater HQ is not calculated. 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 maximum value for boron of 2.4 mg/kg, divided by the noncarcinogenic RAG value of 320 mg/kg is 7.5×10^{-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 116-H-5 waste site is 6.5×10^{-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}. For example, the maximum value for 4,4'-DDD is 0.00212 mg/kg, divided by 0.0365 mg/kg, and multiplied as indicated, is 5.8×10^{-8}. Comparing this value to the requirement of $<1 \times 10^{-6}$, this criterion is met. Aroclor-1254 exceeded the individual carcinogenic risk value. This value is based on only one detected result located in the staging pile

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	C. H. Dobie	Date:	6/1/2011	Calc. No.:	0100H-CA-V0166	Rev.:	0
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	6/1/2011
Subject:	116-H-5 Protection of Groundwater Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	3 of 4

area. Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009), the residual concentration of aroclor-1254 is not expected to migrate more than 0.25 m (0.825 ft) vertically in 1,000 years (based on the distribution coefficient of 75.6 mL/g). The vadose zone underlying the soil below the staging pile area is approximately 10.0 m (33.0 ft) thick. Therefore, residual concentrations of these constituents are predicted to be protective of groundwater and the Columbia River. The cumulative excess cancer risk for the 116-H-5 waste site is 5.8×10^{-8}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this criterion is 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.

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:	C. H. Dobie	Date:	6/2/2011	Calc. No.:	0100H-CA-V0166	Rev.:	0
Project:	100-H Area Field Remediation	Job No:	14655	Checked:	T. E. Queen	Date:	6/2/2011
Subject:	116-H-5 Protection of Groundwater Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	4 of 4

Table 1. Hazard Quotient and Excess Cancer Risk Results for the 116-H-5 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					
Arsenic	14.0	20 [c]	--	--	--
Boron	2.4	320	7.5E-03	--	--
Chromium, hexavalent	0.16	4.8	3.3E-02	--	--
Lead [d]	33.4	353	--	--	--
Molybdenum	0.87	8	1.1E-01	--	--
Inorganic Anions and TPH					
Nitrogen in Nitrate	34.0	2,560	1.3E-02	--	--
Nitrogen in Nitrite	0.40	160	2.5E-03	--	--
TPH - diesel range EXT	19.4	200 [e]	--	--	--
TPH - motor oil (high boiling)	147	200 [e]	--	--	--
Semivolatiles					
Acenaphthene	0.0219	96	2.3E-04	--	--
Acenaphthylene [f]	0.027	96	2.8E-04	--	--
Anthracene	0.087	240	3.6E-04	--	--
Fluoranthene	0.400	64	6.3E-03	--	--
Fluorene	0.057	64	8.9E-04	--	--
Naphthalene	0.0251	16	1.6E-03	--	--
Phenanthrene [f]	0.107	240	4.5E-04	--	--
Pyrene	0.342	48	7.1E-03	--	--
Pesticides					
DDD, 4,4'-	0.00212	--	--	0.0365	5.8E-08
Polychlorinated Biphenyls					
Aroclor-1254 [g]	0.015	0.032	4.7E-01	0.00438	3.4E-06
Totals					
Cumulative Hazard Quotient:			**6.5E-01**		
Cumulative Excess Cancer Risk:					**5.8E-08**

Notes:

[a] = From WCH (2011).

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

[c] = 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 RDR/RAWP (DOE-RL 2009). The arsenic standard is not toxicity based, therefore, will not have a hazard quotient calculated.

[d] = Value for noncarcinogenic RAG calculated using Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children, Children, EPA/540/R 93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

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

[f] = Toxicity data for these chemicals are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: phenathrene; surrogate: anthracene

[g] = Aroclor-1254 was only detected in one location in the staging pile area. Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009), the residual concentration of aroclor-1254 is not expected to migrate more than 0.25 m (0.825 ft) vertically in 1,000 years (based on the distribution coefficient of 75.6 mL/g). The vadose zone underlying the soil below the staging pile area is approximately 10.0 m (33.0 ft) thick. Therefore, the residual concentration of this constituent is predicted to be protective of groundwater and the Columbia River, and is not considered a carcinogenic risk to groundwater.

-- = not applicable

RAG = remedial action goal

CONCLUSION:

This calculation demonstrates that the 116-H-5 waste site meets the requirements for the hazard quotients and excess carcinogenic risk as identified in the RDR/RAWP (DOE-RL 2009).

APPENDIX E

DATA QUALITY ASSESSMENT

APPENDIX E

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 2010). 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 2010), the field logbooks (WCH 2011a, 2011b), 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, BHI 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 116-H-5 waste site were provided by the laboratories in eight sample delivery groups (SDGs): SDG K2057, SDG K2058, SDG K2051, SDG K2053, SDG JP0125, SDG J01037, SDG JP0127, and SDG JP0163. SDG K2057 was submitted for third-party validation. Major and minor deficiencies are discussed for the 116-H-5 data set, as follows below. If no comments are made about a specific analysis, it should be assumed that no deficiencies affecting the quality of the data were found.

MAJOR DEFICIENCIES

Due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, third-party validation flagged the undetected nitrite results in SDG K2057 as rejected, flagged with a "UR." The samples were collected on May 18, 2010, and they were analyzed on June 8, 2010. In addition, the preparation holding time was exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate in SDG K2058, SDG K2051, SDG K2053, SDG JP0127, and SDG J01037. The SDG K2058 samples were collected on May 18, 2010, and analyzed on June 8, 2010. The project flagged the undetected orthophosphate value for sample J19YC9 and all nitrite values for SDG K2058 as rejected with a "UR" flag. The SDG K2051 samples were collected on May 13, 2010, and analyzed on May 24, 2010. The project flagged the undetected nitrate values for samples J19YF4, J19YF5, and J19YH0, the orthophosphate values for sample J19YF8 and J19YH2, and all nitrite values for SDG K2051 as rejected with a "UR" flag. The SDG K2053 samples were collected on May 17, 2010, and analyzed on May 24, 2010. The project flagged

the undetected orthophosphate values for samples J19YH8, J19YH9, and J19YJ1, and all nitrite values for SDG K2053 as rejected with a "UR" flag. The SDG J01037 samples were collected on March 16, 2011, and analyzed on March 22, 2011. The project flagged the undetected orthophosphate value for sample J1FKL4, and both nitrite values for SDG J01037 as rejected with a "UR" flag. The SDG JP0127 samples were collected on March 16, 2011, and analyzed on March 21, 2011. The project flagged the undetected orthophosphate values for samples J1FKL6, J1FKL8, J1FKL9, J1FKM0, J1FKM4, J1FKM6, J1FKM7, and J1FKM9, and all nitrite values for SDG JP0127 as rejected with a "UR" flag. The laboratory reports nitrate, nitrite, and phosphate results when running the IC anion method employed primarily to obtain the sulfate and chloride data. The U.S. Environmental Protection Agency (EPA) analytical method 353.2 was requested to provide acceptable nitrate/nitrite data for decision making purposes. Phosphate is not a regulated chemical under *Washington Administrative Code* (WAC) 173-340, "Model Toxics Control Act – Cleanup." The rejection of the undetected nitrite and orthophosphate data does not hinder the evaluation of the 116-H-5 waste site.

MINOR DEFICIENCIES

SDG K2057

This SDG comprises 10 statistical soil samples (J19YB8-J19YB9, J19YC0 through J19YC7) from the 116-H-5 shallow-zone excavation, and 10 statistical soil samples (J19YD1 through J19YD9, J19YF0) from the 116-H-5 deep-zone excavation. These samples were analyzed for inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, polychlorinated biphenyls (PCB), pesticides, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAH), ion chromatography (IC) anions, nitrate/nitrite, total petroleum hydrocarbons (TPH), carbon-14, nickel-63,and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by gamma energy analysis (GEA). SDG K2057 was submitted for third-party validation. Minor deficiencies are as follows:

In the TPH analysis, all of the motor oil data in SDG K2057 were qualified by third-party validation as estimated with "J" flags, due to lack of a matrix spike (MS), matrix spike duplicate (MSD), and laboratory control sample (LCS) analysis. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the SVOC analysis, the LCS recoveries for 2,4-dinitrophenol (15%), 4,6-dinitro-2-methylphenol (28%), and pentachlorophenol (40%) were below the quality control (QC) criteria. The MSD recoveries for 2,4,6-trichlorophenol (42%) and hexachlorocyclopentadiene (37%) were also below the QC criteria. Due to the low LCS or MSD recoveries for these analytes, third-party validation qualified all the results for these analytes as estimates and flagged "J." Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the SVOC analysis, the MS/MSD relative percent difference (RPD) for 1,2,4-trichlorobenzene (37%), 2,4,5-trichlorophenol (49%), and 2,4,6-trichlorophenol (74%) are above the QC limits. Third-party validation qualified all the results for these analytes as estimates and flagged "J" due

to the RPDs outside QC limits. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, third-party validation flagged the detected nitrate, nitrite, and orthophosphate results in SDG K2057 as estimates, flagged with a "J." Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the IC anions analysis, the nitrate and sulfate results in sample J19YD3 and the nitrate result in sample J19YD4 were qualified by third-party validation as estimated with "J" flags, due to lack of an MS analysis. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the radionuclide analysis, all of the carbon-14 and tritium results were qualified by third-party validation as estimated with "J" flags, due to lack of an MS analysis. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the PAH analysis, a surrogate recovery was above the QC limit for sample J19YD7. All detected PAH results for sample J19YD7 were qualified as estimated with "J" flags. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the pesticides analysis, all of the toxaphene data in SDG K2057 were qualified by third-party validation as estimated with "J" flags, due to lack of an MS, MSD, and LCS analysis. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the PCB analysis, a surrogate recovery was below the QC limit for samples J19YD7 and J19YF0. All PCB results for samples J19YD7 and J19YF0 were qualified as estimated with "J" flags. Estimated, or "J"-flagged, data are acceptable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for three analytes (aluminum, iron, and antimony). For aluminum and iron 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 analytical 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 original MS. The original MS recovery for antimony was 55%. All antimony data for SDG K2057 were considered estimated and flagged "J" by third-party validation due to the MS recoveries outside the QC limits. Estimated data are usable for decision-making purposes.

SDG K2058

This SDG comprises three statistical soil samples (J19YC8, J19YC9, and J19YD0) from the 116-H-5 shallow-zone excavation, and three statistical soil samples (J19YF1-J19YF3) from the 116-H-5 deep-zone excavation. These samples were analyzed for ICP metals, mercury, hexavalent chromium, PCBs, pesticides, SVOCs, PAH, IC anions, nitrate/nitrite, TPH,

carbon-14, nickel-63, and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by GEA. Minor deficiencies are as follows:

In the radionuclide analysis, all of the carbon-14 and tritium results may be considered estimated due to lack of an MS analysis. The data are acceptable for decision-making purposes.

In the TPH analysis, all of the motor oil data in SDG K2058 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the TPH analysis, a surrogate recovery was above the QC limit for sample J19YF1. The detected motor oil result for sample J19YF1 may be considered estimated. The data is acceptable for decision-making purposes.

In the pesticides analysis, all of the toxaphene data in SDG K2058 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, the detected nitrate and orthophosphate results in SDG K2058 may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the SVOC analysis, the LCS recoveries for 2,4,6-trichlorophenol (43%), 2,4-dimethylphenol (35%), 4-chloro-3-methylphenol (40%), 4-nitrophenol (42%), hexachlorocyclopentadiene (38%), and pentachlorophenol (41%) were below the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the SVOC analysis, the MS and MSD recoveries for 1,2,4-trichlorobenzene (34% and 40%), 1,2-dichlorobenzene (37% and 46%), 1,3-dichlorobenzene (36% and 44%), 1,4-dichlorobenzene (35% and 43%), 2,4,5-dichlorophenol (36% and 48%), 2,4,6-trichlorophenol (37% and 47%), 2,4-dichlorophenol (42% and 47%), 2,4-dimethylphenol (47% and 49%), 2-methylnaphthalene (43% and 47%), 2-nitrophenol (41% and 48%), 3,3'-dichlorobenzidine (31% and 37%), 4-chloroaniline (25% and 27%), 4-nitrophenol (40% and 44%), benz(a)anthracene (41% and 42%), benzo(a)pyrene (42% and 43%), benzo(b)fluoranthene (39% and 43%), benzo(k)fluoranthene (44% and 42%), bis(2-chloroethoxy)methane (40% and 47%), bis(2-chloroethyl)ether (41% and 49%), bis(2-chloroisopropyl)ether (39% and 47%), chrysene (41% and 42%), fluoranthene (28% and 30%), hexachlorobutadiene (36% and 43%), hexachlorocyclopentadiene (15% and 22%), hexachloroethane (31% and 40%), naphthalene (38% and 44%), nitrobenzene (39% and 44%), pentachlorophenol (12% and 11%), and pyrene (35% and 31%) were below the QC criteria. In addition, the MS recoveries for 2-chlorophenol (42%), 2-methylphenol (47%), benzo(g,h,i)perylene (49%), isophorone (39%), n-nitrosodi-n-propylamine (49%), and phenol (49%) were below the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the PAH analysis, a surrogate recovery was above the QC limit for sample J19YC8. The detected PAH results for sample J19YC8 may be considered estimated. The data is acceptable for decision-making purposes.

In the PAH analysis, the MS and MSD recoveries for phenanthrene (32% and 206%), fluoranthene (-18% and 734%), indeno(1,2,3-cd)pyrene (262% and 545%), benz(a)anthracene (4% and 439%), chrysene (5% and 397%), and benzo(a)pyrene (11% and 524%) were outside the QC limits. In addition, the MSD recoveries for pyrene (535%), benzo(b)fluoranthene (666%), benzo(k)fluoranthene (274%), dibenz(a,h)anthracene (163%), and benzo(g,h,i)perylene (293%) were above the acceptance criteria. The laboratory indicated matrix interference as the probable cause for the MS and MSD recoveries. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for five analytes (aluminum, iron, manganese, antimony, and silicon). For most of these analytes 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 analytical 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 original MS. The original MS recovery for antimony was 44%. All antimony data for SDG K2058 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all silicon results may be considered estimated due to an LCS below quality control limits at 63%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all boron results may be considered estimated due to an RPD above quality control limits at 48%. Estimated data are usable for decision-making purposes.

SDG K2051

This SDG comprises 13 statistical soil samples (J19YF4 through J19YF9, J19YH0 through J19YH6) from the 116-H-5 overburden. This SDG includes a field duplicate pair (J19YF8/J19YH6). These samples were analyzed for ICP metals, mercury, hexavalent chromium, PCBs, pesticides, SVOCs, PAH, IC anions, nitrate/nitrite, TPH, carbon-14, nickel-63, and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by GEA. Minor deficiencies are as follows:

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, the detected nitrate and orthophosphate results in SDG K2051 may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the IC anions analysis, the fluoride results may be considered estimated due to an RPD above quality control limits at 41%. Estimated data are usable for decision-making purposes.

In the nitrate/nitrite analysis, the results may be considered estimated due to an RPD above quality control limits at 39%. Estimated data are usable for decision-making purposes.

In the radionuclide analysis, all of the carbon-14 and tritium results may be considered estimated due to lack of an MS analysis. The data are acceptable for decision-making purposes.

In the pesticides analysis, all of the toxaphene data in SDG K2051 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the PAH analysis, a surrogate recovery was above the QC limit for sample J19YH1. The detected PAH results for sample J19YH1 may be considered estimated. The data is acceptable for decision-making purposes.

In the SVOC analysis, the LCS recoveries for each analyte ranged between 6% and 33%, all below the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the SVOC analysis, the MS and MSD recoveries for 4-chloroaniline (47% and 48%) were below the acceptance criteria. In addition, the MS recovery for 2,4-dinitrophenol (48%) and the MSD recovery for pentachlorophenol (45%) were below the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the TPH analysis, all of the motor oil data in SDG K2051 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for four analytes (chromium, manganese, antimony, and silicon). For iron and manganese 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 52% and 177%, respectively. All antimony and silicon data for SDG K2051 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all silicon results may be considered estimated due to an LCS below quality control limits at 43%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all molybdenum results may be considered estimated due to an RPD above quality control limits at 35%. Estimated data are usable for decision-making purposes.

SDG K2053

This SDG comprises three statistical soil samples (J1B4H9, J1B4J0, and J1B4J1) from the 116-H-5 overburden and 13 statistical soil samples (J19YH7 through J19YH9, J19YJ0 through J19YJ9) from the staging pile area. This SDG included a field duplicate pair (J19YJ4/J19YJ9). These samples were analyzed for ICP metals, mercury, hexavalent chromium, PCBs, pesticides, SVOCs, PAH, IC anions, nitrate/nitrite, TPH, carbon-14, nickel-63, and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by GEA. In addition, one equipment blank (J19YK0) was analyzed for ICP metals, mercury, and SVOCs. Minor deficiencies are as follows:

In the radionuclide analysis, all of the carbon-14 and tritium results may be considered estimated due to lack of an MS analysis. The data are acceptable for decision-making purposes.

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, the detected nitrate and orthophosphate results in SDG K2053 may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the IC anions analysis, the fluoride and sulfate results may be considered estimated due to an RPD above quality control limits at 55.1% and 49.5%, respectively. Estimated data are usable for decision-making purposes.

In the pesticides analysis, all of the toxaphene data in SDG K2053 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the pesticides analysis, the MS recovery for methoxychlor (154%) is above the QC criteria. The methoxychlor results may be considered estimated. The data are acceptable for decision-making purposes.

In the SVOC analysis, one surrogate recovery for sample J19YH8 is below the acceptance criteria. The SVOC data for sample J19YH8 may be considered estimated. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the LCS recoveries for 2,4,6-trichlorophenol (38%), 2,4-dimethylphenol (46%), 4-chloroaniline (40%), hexachlorocyclopentadiene (43%), and pentachlorophenol (34%), were all below the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the SVOC analysis, the MS and MSD recoveries for hexachlorocyclopentadiene (38% and 29%) and pentachlorophenol (42% and 46%) were below the acceptance criteria. In addition, the MSD recovery for di-n-octyl phthalate (156%) was above the QC criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the SVOC analysis, the MS/MSD RPDs for benzo(b)fluoranthene (31%), benzo(k)fluoranthene (39%), chrysene (31%), di-n-octyl phthalate (31%), fluoranthene (46%), and pyrene (36%), were above the acceptance criteria. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the PAH analysis, the surrogate recovery for sample J19YJ2 is above the acceptance criteria. All detected PAH data for sample J19YJ2 may be considered estimated. Estimated data are usable for decision-making purposes.

In the PAH analysis, the MS and MSD recoveries for phenanthrene (154% and 184%), fluoranthene (301% and 904%), pyrene (247% and 849%), benz(a)anthracene (169% and 364%), chrysene (250% and 241%), and benzo(b)fluoranthene (376% and 422%) were above the QC limits. In addition, the MSD recoveries for acenaphthene (44%), anthracene (180%), indeno(1,2,3-cd)pyrene (327%), benzo(k)fluoranthene (251%), benzo(a)pyrene (372%), dibenz(a,h)anthracene (160%), and benzo(g,h,i)perylene (277%) were outside the acceptance criteria. The laboratory indicated sample interference as the probable cause for the MS and MSD recoveries. The results for these analytes may be considered estimated. The data are acceptable for decision-making purposes.

In the TPH analysis, all of the motor oil data in SDG K2053 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the TPH analysis, the MS and MSD for the diesel range organics in SDG K2053 are above the QC criteria at 153% and 121%, respectively. The diesel range organics data may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for four analytes (aluminum, iron, antimony, and silicon). For aluminum and iron 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 56% and 204%, respectively. All antimony and silicon data for SDG K2053 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all arsenic results may be considered estimated due to an RPD above quality control limits at 37%. Estimated data are usable for decision-making purposes.

SDG JP0125

This SDG comprises 13 statistical soil samples (J1FKK1 through J1FKK9, J1FKL0 through J1FKL3) from the 116-H-5 deep-zone excavation. These samples were taken to replace the ICP metals, mercury, SVOC, and PAH results for samples J19YD1 through J19YD9 and J19YF0

through J19YF3, reported in SDG K2057 and SDG K2058. This SDG includes a field duplicate pair (J1FKK8/J1FKL3). Minor deficiencies are as follows:

In the ICP metals analysis, all silicon results may be considered estimated due to an LCS below quality control limits at 11%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for four analytes (aluminum, iron, antimony, and silicon). For aluminum and iron 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 66% and 15%, respectively. All antimony and silicon data for SDG JP0125 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG JP0127

This SDG comprises 13 statistical soil samples (J1FKL7 through J1FKL9, J1FKM0 through J1FKM9) from the staging pile area. This SDG included a field duplicate pair (J1FKM0/J1FKM9). These samples were analyzed for ICP metals, mercury, hexavalent chromium, PCBs, pesticides, SVOCs, PAH, IC anions, nitrate/nitrite, TPH, carbon-14, nickel-63, and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by GEA. In addition, one equipment blank (J1FKN0) was analyzed for ICP metals, mercury, and SVOCs. These samples were taken to replace the original staging pile area samples (J19YH7 through J19YH9, J19YJ0 through J19YJ9) and equipment blank sample (J19YK0), reported in SDG K2053. Minor deficiencies are as follows:

In the hexavalent chromium analysis, all results may be considered estimated due to an RPD above quality control limits at 40%. Estimated data are usable for decision-making purposes.

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, the detected nitrate and orthophosphate results in SDG JP0127 may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the SVOC analysis, the bis(2-ethylhexyl)phthalate results are of similar magnitude as the method blank result, and may be considered estimated due to method blank contamination. The data are usable for decision-making purposes.

In the pesticides analysis, all of the toxaphene data in SDG JP0127 may be considered estimated due to lack of an MS, MSD, and LCS analysis. Estimated data are acceptable for decision-making purposes.

In the pesticides analysis, the MSD recovery for 4,4'-DDE (12%) is below the QC criteria. The 4,4'-DDE results may be considered estimated. The data are acceptable for decision-making purposes.

In the ICP metals analysis, all silicon results may be considered estimated due to an LCS below quality control limits at 9%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for five analytes (aluminum, iron, manganese, antimony, and silicon). For aluminum, iron, and manganese 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 54% and 12%, respectively. All antimony and silicon data for SDG JP0127 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG J01037

This SDG comprises two statistical soil samples (J1FKL4 and J1FKL5) from the shallow zone. These samples were analyzed for ICP metals, mercury, hexavalent chromium, PCBs, pesticides, SVOCs, PAH, IC anions, nitrate/nitrite, TPH, carbon-14, nickel-63, and tritium by liquid scintillation counting, strontium-90, technetium-99, isotopic plutonium, and by GEA. These samples were taken to replace the original shallow zone samples J19YC6 and J19YC8, reported in SDG K2057 and K2058. Minor deficiencies are as follows:

In the IC anions analysis, due to the preparation holding time being exceeded by greater than twice the limit of 48 hours for nitrate, nitrite, and orthophosphate, the detected nitrate and orthophosphate results in SDG J01037 may be considered estimated. Estimated data are acceptable for decision-making purposes.

In the IC anions analysis, the orthophosphate result for sample J1FKL5 is of similar magnitude as the method blank result, and may be considered estimated due to method blank contamination. The data is usable for decision-making purposes.

In the ICP metals analysis, the silicon result may be considered estimated due to an LCS below quality control limits at 40%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for five analytes (aluminum, iron, manganese, antimony, and silicon). For aluminum, iron, and manganese 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 64% and

41%, respectively. All antimony and silicon data for SDG J01037 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all beryllium and cadmium results may be considered estimated due to RPDs above quality control limits at 32% and 52%, respectively. Estimated data are usable for decision-making purposes.

SDG JP0163

This SDG comprises seven statistical soil samples (J1HH80 through J1HH86) from the 116-H-5 deep-zone excavation. These samples were taken to replace the ICP metals, mercury, SVOCs, and PAH results for samples J1FKK1 through J1FKK4, J1FKK7 through J1FKK8, and J1FKL3, reported in SDG JP0125. This SDG includes a field duplicate pair (J1HH85/J1HH86). In addition, one equipment blank (J1HH87) was analyzed for ICP metals, mercury, and SVOCs. Minor deficiencies are as follows:

In the SVOC analysis, the bis(2-ethylhexyl)phthalate results are of similar magnitude as the method blank result, and may be considered estimated due to method blank contamination. The data are usable for decision-making purposes.

In the ICP metals analysis, the chromium and zinc results for sample J1HH87 (the equipment blank) are of similar magnitude as the method blank results, and may be considered estimated due to method blank contamination. The data are usable for decision-making purposes.

In the ICP metals analysis, the silicon result may be considered estimated due to an LCS below quality control limits at 16%. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries were out of project acceptance criteria for four analytes (aluminum, iron, antimony, and silicon). For aluminum and iron 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 analytical variability of the native concentration rather than a measure of the recovery from the sample. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recoveries for antimony and silicon were 51% and 16%, respectively. All antimony and silicon data for SDG JP0163 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, all silicon results may be considered estimated due to an RPD above quality control limits at 32%. 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 quality assurance (QA)/QC measures are used to assess potential sources of error and cross contamination of samples that could bias results. Field QA/QC samples, listed in the field logbook (WCH 2011a, 2011b), are shown in Table E-1. The main and QA/QC sample results are presented in Appendix D.

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

Sample Area	Main Sample	Duplicate Sample
Shallow Zone	J19YB9	J19YD0
Deep Zone	J1HH85	J1HH86
Staging Pile Area	J1FKM0	J1FKM9
Overburden	J19YF8	J19YH6

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). RPDs are not calculated for analytes that are not detected in both the main and duplicate sample at more than 5 times the target detection limit (TDL). RPDs of analytes detected at low concentrations (less than 5 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 for benzo(a)pyrene (34.5%), fluoranthene (31.9%), phenanthrene (59.5%), and TPH motor oil (45.6%) in the staging pile area duplicate sample are all above the acceptance criteria of 30%. A secondary check of the data variability is used when one or both of the samples being evaluated (main and duplicate) is less than 5 times the TDL, including undetected analytes. In these cases, a control limit of ±2 times the TDL is used (Appendix D) to indicate that a visual check of the data is required by the reviewer. The benzo(g,h,i)perylene and anthracene duplicate sample results from the staging pile area 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 116-H-5 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 116-H-5 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 (ENRE) project-specific database prior to being submitted for inclusion in the Hanford Environmental Information System (HEIS) database. The verification sample analytical data are also summarized in Appendix D.

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