0101480

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-FR-1 **Control No.:** 2011-083

Waste Site Code(s)/Subsite Code(s):

100-F-55

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:

(What is the current physical state of the site? What activities have been performed?)

The 100-F-55, 1607-F7 Contaminated Ash Layer is part of the 100-FR-1 Operable Unit and is located within the former 100-F Area Experimental Animal Farm (EAF) complex. The 100-F-55 waste site was identified for remedial action in the *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 2009). The waste site consisted of a black layer of ash found approximately 0.3 m (1 ft) below ground surface, north of the former 141-M Building, and east of the 1607-F7 septic tank. Remedial action at the 100-F-55 waste site was performed from September 16 to October 7, 2010, to a depth of 0.7 m (2.3 ft) to remove the ash layer. The 100-F-55 excavation removed 15 bank cubic meters (19.62 bank cubic yards) of soil, which were transported to the Environmental Restoration Disposal Facility (ERDF) for disposal. The 100-F-55 waste site was remediated in conjunction with collocated waste site 100-F-62, and the waste sites were combined for verification sampling.

Verification sampling was performed to determine if the waste site meets the remedial action objectives (RAOs) and remedial action goals (RAGs) established by the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD), U.S. Environmental Protection Agency, Region 10, Seattle, Washington and in the *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 (DOE-RL 2009). 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 ERDF, (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:

(How does the site meet the reclassification status?)

In accordance with this evaluation, the verification sampling results support a reclassification of the 100-F-55 waste site to Interim Closed Out. The current site conditions achieve the RAOs and RAGs established by the Remaining Sites ROD (EPA 1999). In addition, the 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 results also show that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. Site contamination did not extend into the deep-zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-F-55, 1607-F7 Contaminated Ash Layer and 100-F-62, Animal Farm Septic Lines* (attached).

Attached to: 0101479

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-FR-1 **Control No.:** 2011-083

Waste Site Code(s)/Subsite Code(s):

100-F-55

Project Manager comments:

Waste Site Controls:

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

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

M. S. French	MS French	12/20/11
DOE Federal Project Director (printed)	Signature	Date
N/A		
Ecology Project Manager (printed)	Signature	Date
C. Guzzetti		12/22/11
EPA Project Manager (printed)	Signature	Date

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-FR-1 **Control No.:** 2011-104

Waste Site Code(s)/Subsite Code(s):

100-F-62

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:

(What is the current physical state of the site? What activities have been performed?)

The 100-F-62, Animal Farm Septic Lines waste site is part of the 100-FR-1 Operable Unit and is located within the former 100-F Area Experimental Animal Farm (EAF) complex. The 100-F-62 waste site was identified as an additional site for remediation in the *Fact Sheet: Annual Listing of Waste Sites Plugged into the Remove, Treat and Dispose Remedy in the 1999 Interim Action Record of Decision for the 100 Area,* AR/PIR Accession Number 0084011, U.S. Department of Energy, Richland Operations Office, Richland, Washington (DOE-RL 2011). The waste site included suspected pipelines from the 141-M and 144-F Buildings to the 1607-F7 and 100-F-31 septic systems.

Remedial action at the 100-F-62 waste site was performed from December 2010 to March 2011 to remove 594 BCM (777 BCY) of soil, and additional remediation occurred from July to September 2011 that removed 1,018 BCM (1,301 BCY) of soil. The north pipeline excavation included removal of the pipelines to the former 1607-F7 septic system and was 2.3 m (7.6 ft) in depth. Remedial actions at the south pipeline excavation could not locate the pipeline to the former 100-F-31 septic system, but the historical extent of the pipeline was remediated to a depth of 4.4 m (14.5 ft). All waste material was disposed at the Environmental Restoration Disposal Facility (ERDF). The 100-F-62 waste site was remediated in conjunction with collocated waste site 100-F-55, and the waste sites were combined for verification sampling.

Verification sampling was performed to determine if the waste site meets the remedial action objectives (RAOs) and remedial action goals (RAGs) established by the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD), U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 1999) and in the *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 (DOE-RL 2009). 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 ERDF, (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:

(How does the site meet the reclassification status?)

In accordance with this evaluation, the verification sampling results support a reclassification of the 100-F-62 waste site to Interim Closed Out. The current site conditions achieve the RAOs and RAGs established by the Remaining Sites ROD (EPA 1999). In addition, the 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 results also show that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. Site contamination did not extend into the deep-zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-F-55, 1607-F7 Contaminated Ash Layer and 100-F-62, Animal Farm Septic Lines* (attached).

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-FR-1 **Control No.:** 2011-104

Waste Site Code(s)/Subsite Code(s):

100-F-62

Project Manager comments:

Waste Site Controls:

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

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

M. S. French DOE Federal Project Director (printed)	Signature	12/20/11 Date
N/A Ecology Project Manager (printed)	Signature	Date
C. Guzzetti EPA Project Manager (printed)	Signature	12/22/11 Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-F-55, 1607-F7 CONTAMINATED ASH LAYER AND 100-F-62, ANIMAL FARM SEPTIC LINES

Attachment to Waste Site Reclassification Forms 2011-083 and 2011-104

October 2011

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-F-55, 1607-F7 CONTAMINATED ASH LAYER AND 100-F-62, ANIMAL FARM SEPTIC LINES

EXECUTIVE SUMMARY

The 100-F-55, 1607-F7 Contaminated Ash Layer and the 100-F-62, Animal Farm Septic Lines waste sites are part of the 100-FR-1 Operable Unit and are located within the former 100-F Area Experimental Animal Farm (EAF) complex. The 100-F-55 waste site was a black layer of ash less than 0.3 m (1 ft) thick, which was uncovered approximately 0.3 m (1 ft) below ground surface near the 1607-F7 septic system. The 100-F-62 waste site included suspected pipelines from the 141-M and 144-F Buildings to the 1607-F7 and 100-F-31 septic systems. The 100-F-55 waste site is located near the 100-F-62 north pipeline that connected to the 1607-F7 septic system.

Remedial action at the 100-F-55 waste site was performed from September 16 to October 7, 2010. The 100-F-55 waste site was excavated to a depth of 0.7 m (2.3 ft), which resulted in 15 bank cubic meters (BCM) (19.62 bank cubic yard [BCY]) of contaminated soil being removed. Remedial action at the 100-F-62 waste site was performed from December 2010 to March 2011 to remove 594 BCM (777 BCY) of soil. Five waste staging pile areas were used during the excavation for stockpiling the excavated material prior to disposal at the Environmental Restoration Disposal Facility (ERDF). The 100-F-62 north pipeline excavation included the removal of the pipelines to the former 1607-F7 septic tank and contained the 100-F-55 waste site excavation. From the north excavation, approximately 2 m (7 ft) of the 4-in.-diameter vitrified clay pipe were removed, and approximately 5 m (16 ft) of the 4-in.-diameter steel pipe with lead bells were removed. A 6-in.-diameter cast-iron pipe believed to run from the 144-F Inhalation Toxicology Laboratory facility to the 100-F-31 septic system could not be located, but the area of the suspected pipeline location was remediated.

The 100-F-55 and 100-F-62 waste sites were combined for verification sampling, which was conducted June 29 and July 5, 2011. Results indicated that multiple sample locations in the north and south excavation decision units contained concentrations of aroclor-1248, dieldrin, benzo(a)anthracene, and benzo(a)pyrene that exceeded the corresponding direct exposure remedial action goals (RAGs). In addition, results of two composite samples in the east and south staging pile areas indicated benzo(a)pyrene concentrations above the direct exposure RAG. As a result, additional remediation was performed from July 29 to August 9, 2011, and resulted in the removal of 1,018 BCM (1,301 BCY) of soil that was disposed at the ERDF. The center section of the north excavation was further remediated, and the entire south excavation was further remediated and expanded to the south. The final north excavation depth is 2.3 m (7.6 ft), and the final south excavation depth is 4.4 m (14.5 ft). Additional remediation also occurred at the east staging pile area and the northeast quadrant of the south staging pile area.

Replacement verification samples were collected in August 2011 only at sample locations that previously exceeded cleanup criteria. Due to the change in the south excavation boundary, a focused sample was collected at the location where the 100-F-62 pipeline historically connected

to the 100-F-31 septic tank. The SPA-7 quadrant in the east stockpile required additional remediation in August and September after sample results contained residual concentrations of benzo(a)pyrene above cleanup criteria. After additional remediation, the verification sampling results indicate that the waste removal action achieved compliance with the remedial action objectives (RAOs) and RAGs established in 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) and in the *Remedial Design Report/Remedial Action Work Plan for the 100 Areas,* DOE/RL-96-17, Rev. 6, (RDR/RAWP) (DOE-RL 2009b).

A summary of the cleanup evaluation for the soil results compared to the applicable cleanup criteria is presented in Table ES-1. The results of the verification sampling are used to make reclassification decisions for the 100-F-55 and 100-F-62 waste sites in accordance with the TPA-MP-14 procedure in the *Tri-Party Agreement Handbook Management Procedures* (DOE-RL 2011). In accordance with this evaluation, the verification sampling results support a reclassification of these sites to Interim Closed Out.

Table ES-1. Summary of Remedial Action Goals for the 100-F-55 and 100-F-62 Waste Sites. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain 15-mrem/yr dose rate above background over 1,000 years.	All radionuclide COPCs were undetected at the 100-F-55 and 100-F-62 waste sites, with the exception of cesium-137, which was detected below background level.	Yes
Direct Exposure – Nonradionuclides	Attain individual COPC RAGs.	All individual COC and COPC concentrations are below the direct exposure RAGs.	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 for all sampling areas (3.5×10^{-1}) 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 (2.9×10^{-6}) is $<1 \times 10^{-5}$.	

Table ES-1. Summary of Remedial Action Goals for the 100-F-55 and 100-F-62 Waste Sites. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Groundwater/River Protection – Radionuclides	Attain single COC groundwater and river RAGs.	No radionuclides were quantified above groundwater/river protection soil lookup values.	Yes
	Attain National Primary Drinking Water Regulations: 4 mrem/yr (beta/gamma) dose standard to target receptor/organ [a].	No radionuclides were quantified above groundwater/river protection soil lookup values.	
	Meet drinking water standards for alpha emitters: the more stringent of 15 pCi/L MCL or 1/25th of the derived concentration guide for DOE Order 5400.5 [b].	Alpha-emitting radionuclides were not detected at the 100-F- waste site.	
	Meet total uranium standard of 21.2 pCi/L [c].	Uranium was not quantified above background levels for this site.	
Groundwater/River Protection – Nonradionuclides	Attain individual nonradionuclide groundwater and Columbia River cleanup requirements.	The following contaminants are present at concentrations slightly above soil RAGs for groundwater and/or Columbia River protection: lead, mercury, silver, zinc, chlordane (alpha- and gamma-), 4,4'-DDE, 4,4'-DDT, dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, aroclor-1248, aroclor-1254, and aroclor-1260. However, RESRAD modeling predicts that these contaminants will not migrate to groundwater (and thus the Columbia River) at concentrations exceeding groundwater or river protection criteria within 1,000 years. Therefore, residual concentrations achieve the remedial action objectives for groundwater and river protection [d].	Yes

[a] "National Primary Drinking Water Regulations" (40 *Code of Federal Regulations* 141).

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

[c] Based on the isotopic distribution of uranium in the 100 Area, the 30 µg/L MCL corresponds to 21.2 pCi/L. Concentration-to-activity calculations are documented in *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater* (BHI 2001).

[d] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentrations of these contaminants in the north and south excavations and waste staging pile areas footprints are not expected to migrate more than 3.0 m (9.8 ft) vertically in 1,000 years (based on the contaminant with the lowest distribution coefficient (K_d) of 25.6 mL/g for dieldrin). The vadose zone underlying the soil below the site is approximately 9.1 m (29.9 ft) thick based on an elevation of 122.6 m (402.2 ft) at the deepest portion of the excavation and a groundwater elevation of 113.5 m (372.4 ft). Therefore, residual concentrations of these constituents are predicted to be protective of groundwater and the Columbia River.

COC = contaminant of concern
COPC = contaminant of potential concern
DOE = U.S. Department of Energy
MCL = maximum contaminant level
RAG = remedial action goal
RESRAD = RESidual RADioactivity
RDR/RAWP = *Remedial Design Report/Remedial Action Work Plan for the 100 Area*

The verification sample 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 also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. Site contamination did not extend into the deep zone; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required.

Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based in part 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 site contaminants of concern, contaminants of potential concern, and other constituents. Those constituents exceeding the ecological screening level in the *Washington Administrative Code* Chapter 173-340, Table 749-3, were barium, boron, mercury, and vanadium. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for antimony, lead, manganese, vanadium, zinc, and dieldrin. Exceedance of screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. Because the statistical results and/or detected levels of antimony, manganese, and vanadium are below Hanford Site background levels, it is believed that the presence of these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for ecological effects as a part of the final closeout decision for the Columbia River corridor portion of the Hanford Site.

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-F-55, 1607-F7 CONTAMINATED ASH LAYER AND 100-F-62, ANIMAL FARM SEPTIC LINES

STATEMENT OF PROTECTIVENESS

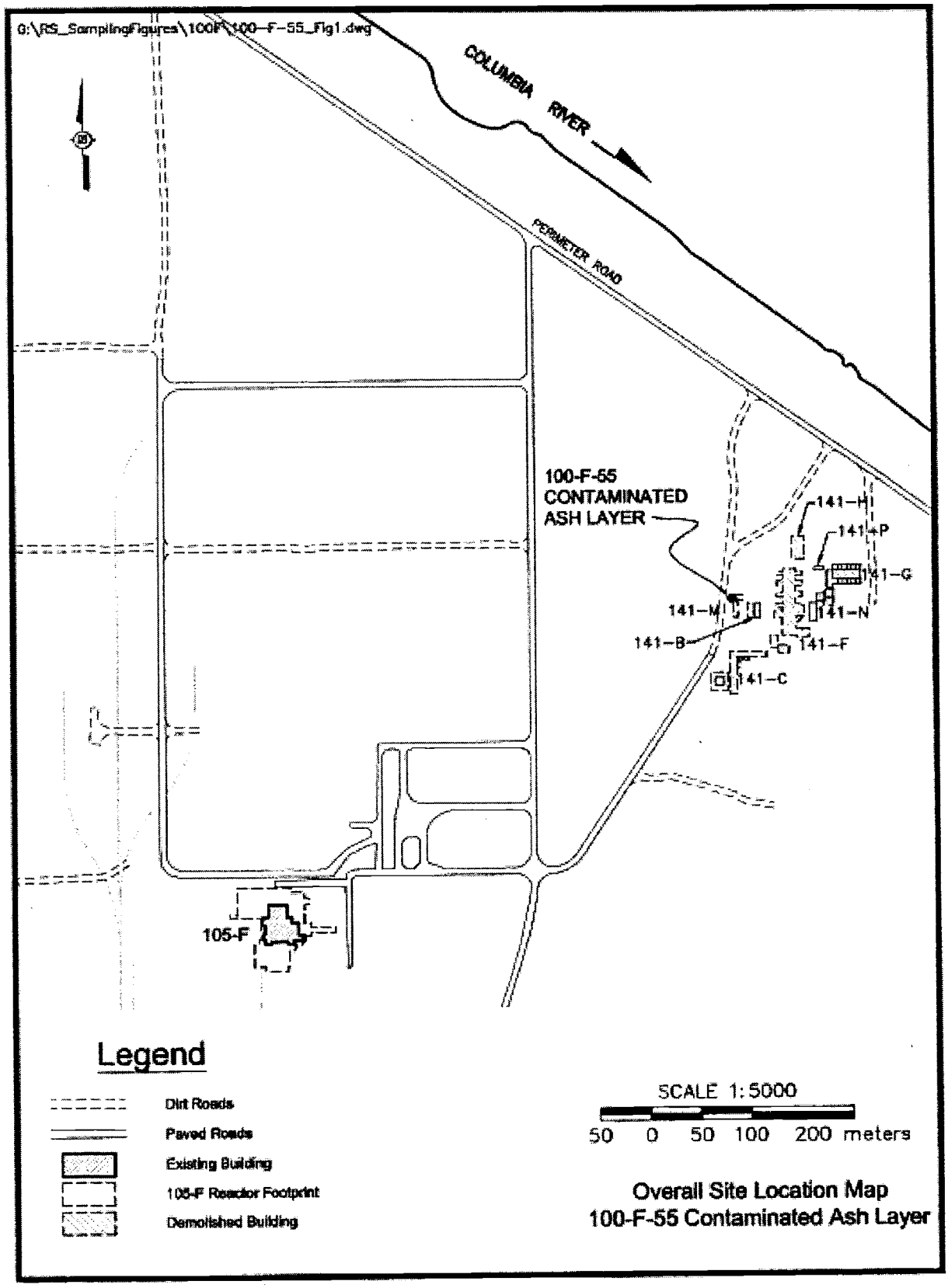
The 100-F-55, 1607-F7 Contaminated Ash Layer and 100-F-62, Animal Farm Septic Lines verification sampling data, site evaluations, and supporting documentation demonstrate that these sites meet the objectives established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2009b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) (EPA 1999). These results show that residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario. The results also demonstrate that residual contaminant concentrations support unrestricted future use of shallow-zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. Contamination at the 100-F-55 and 100-F-62 waste sites does not extend into the deep zone; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone of the site are not required.

Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based in part 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 site contaminants of concern, contaminants of potential concern, and other constituents. Those constituents exceeding the ecological screening level in the *Washington Administrative Code* 173-340, Table 749-3 were barium, boron, mercury, and vanadium. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for antimony, lead, manganese, vanadium, zinc, and dieldrin. Exceedance of screening values does not necessarily indicate the existence of risk to ecological receptors. Because the statistical results and/or detected levels of antimony, manganese, and vanadium are below Hanford Site background levels, it is believed that the presence of these constituents does not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for ecological effects as a part of the final closeout decision for the Columbia River corridor portion of the Hanford Site.

GENERAL SITE INFORMATION AND BACKGROUND

The 100-F-55 and 100-F-62 waste sites, part of the 100-FR-1 Operable Unit, were both situated within the 100-F Area Experimental Animal Farm (EAF) complex. The EAF Complex was located approximately 500 m (0.3 mi) northeast of the 105-F Reactor (Figure 1). The 100-F-55, 1607-F7 Contaminated Ash Layer waste site consisted of a black layer of ash less than 0.3 m (1 ft) thick that was discovered approximately 0.3 m (1 ft) below ground surface during confirmatory sampling activities for the 1607-F7 septic system. The ash layer was found north

Figure 1. The 100-F-55 Waste Site Location Map.



of the former 141-M Building and east of the 1607-F7 septic tank. The site was outside the septic tank and determined to be unassociated with the septic system processes.

The 100-F-62, Animal Farm Septic Lines waste site included suspected pipelines from the 141-M and 144-F Buildings to the 1607-F7 and 100-F-31 septic systems (Figure 2). The section of piping near the 100-F-55 waste site ran from the 141-M Building to the 1607-F7 septic tank and consisted of 4-in.-diameter vitrified clay pipe from original construction and 4-in.-diameter steel pipe with lead bells from the north addition to the 141-M Building. The pipelines were located during in-process sampling and were remediated. The pipes were located along the west and north side of the 141-M Building. A 6-in.-diameter cast iron pipe believed to run from the 144-F Inhalation Toxicology Laboratory facility to the 100-F-31 septic system could not be located, but the area of the suspected pipeline location was remediated. The 100-F-31 septic system was located directly south of the 144-F Building and approximately 20 m (65 ft) west of the former location of the 107-F Retention Basin fence.

EAF operations started in 1945 and continued until 1976 at which point research was transferred to the 300 Area (BHI 1994). Prior to operations, temporary buildings were located near the 141-M Building location as construction of the adjacent railroad was ongoing in 1944 (Figure 3). The 141-M Building and 1607-F7 septic system were installed in 1949 (Figure 4). Visible in the 1944 photograph is the proximity of the 100-F-55 waste site location to the railroad track and 184-F Powerhouse. The ash layer has been speculated to be coal that would have been transported by railcar to the powerhouse, or coal ash that was reportedly used as fill in low areas (WCH 2007). At the conclusion of EAF operations, the 141-M facility was removed, and use of the septic system discontinued. The 144-F facility was decontaminated and removed in 1978, and the septic system was left in place (WHC 1991). The majority of the EAF buildings were removed by 1979 (BHI 1994).

The 1607-F7 and 100-F-31 waste sites were remediated and interim closed in 2006 (WCH 2006a, WCH 2006b). The 100-F-62 pipelines associated with these systems were not removed during remedial action activities (WCH 2006c). Part of the southern pipeline was reportedly removed with Group 4 Remedial Action in 2002 that included sections of the 100-F-29, 100-F Experimental Animal Farm Process Sewer Pipelines (BHI 2002). One segment of the 100-F-29 pipelines bisected the 100-F-62 pipeline, and another segment was located just north of the pipeline. According to the Waste Site Information Data System, an estimated 13 m (43 ft) of the 100-F-62 southern pipeline was thought to have remained from previous remedial action activities in the area south of the location of the former 144-F Building.

In 2004, the 100-F-55 waste site was discovered during confirmatory sampling activities performed under the *Work Instruction for 1607-F7, 141-M Building Septic Tank* (BHI 2004a). Based on the results of the geophysical survey, a test trench was excavated to establish the location of the septic tank (Figure 5). According to the sampling logbook, a burnt area was discovered below the surface on the north wall of the trench. A sample was collected from the burnt area or ash layer on October 6, 2004, with Hanford Environmental Information System (HEIS) number J01XN1 (BHI 2004b). Sample results indicated that the ash layer contained a concentration of hexavalent chromium above cleanup levels. The ash layer was identified as

Figure 2. The 100-F-62 Pipelines Location Map.

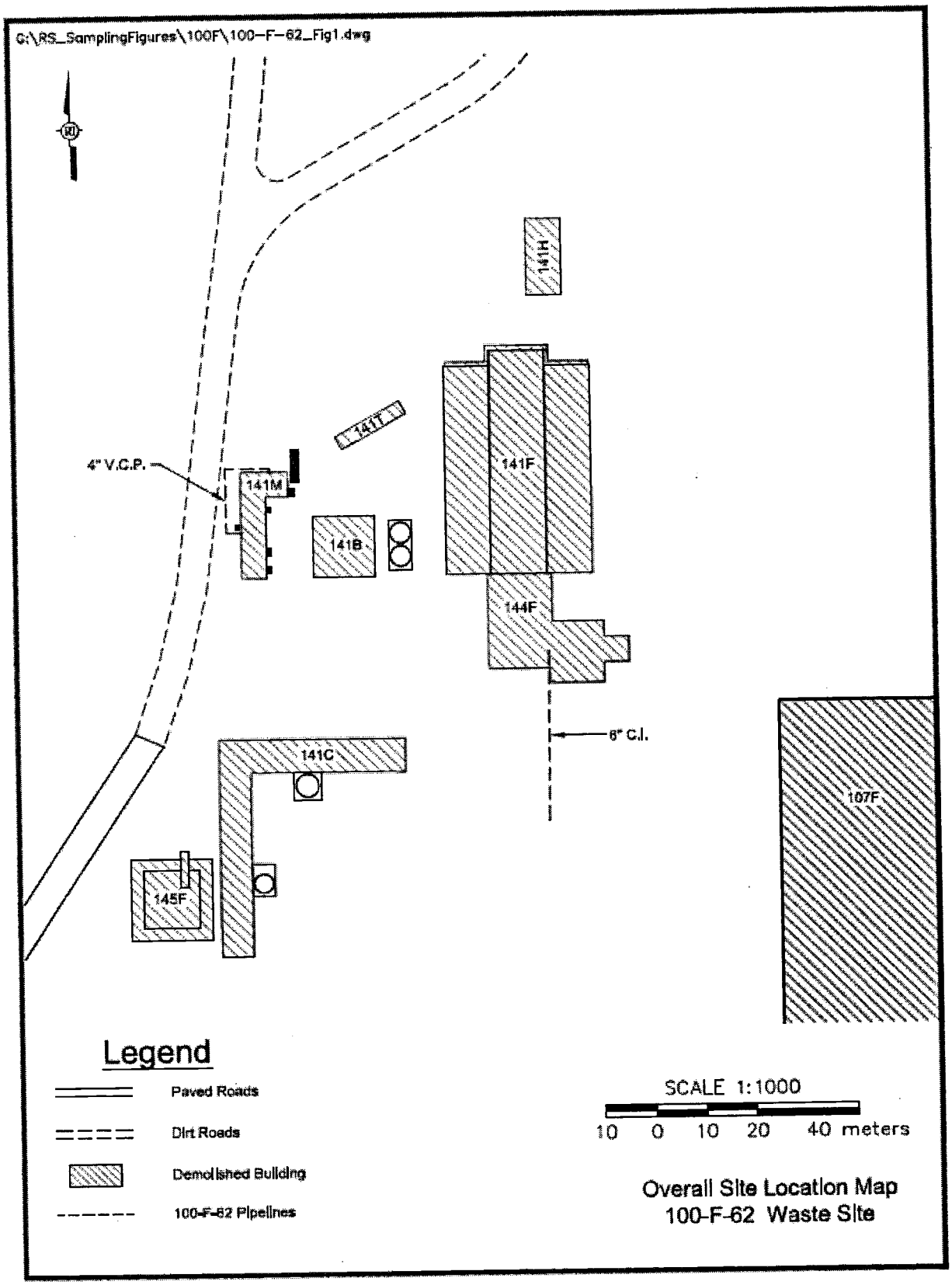


Figure 3. Experimental Animal Farm Area in 1944 during Construction of Railroad.

Figure 4. Construction of 141-M Building in 1949.

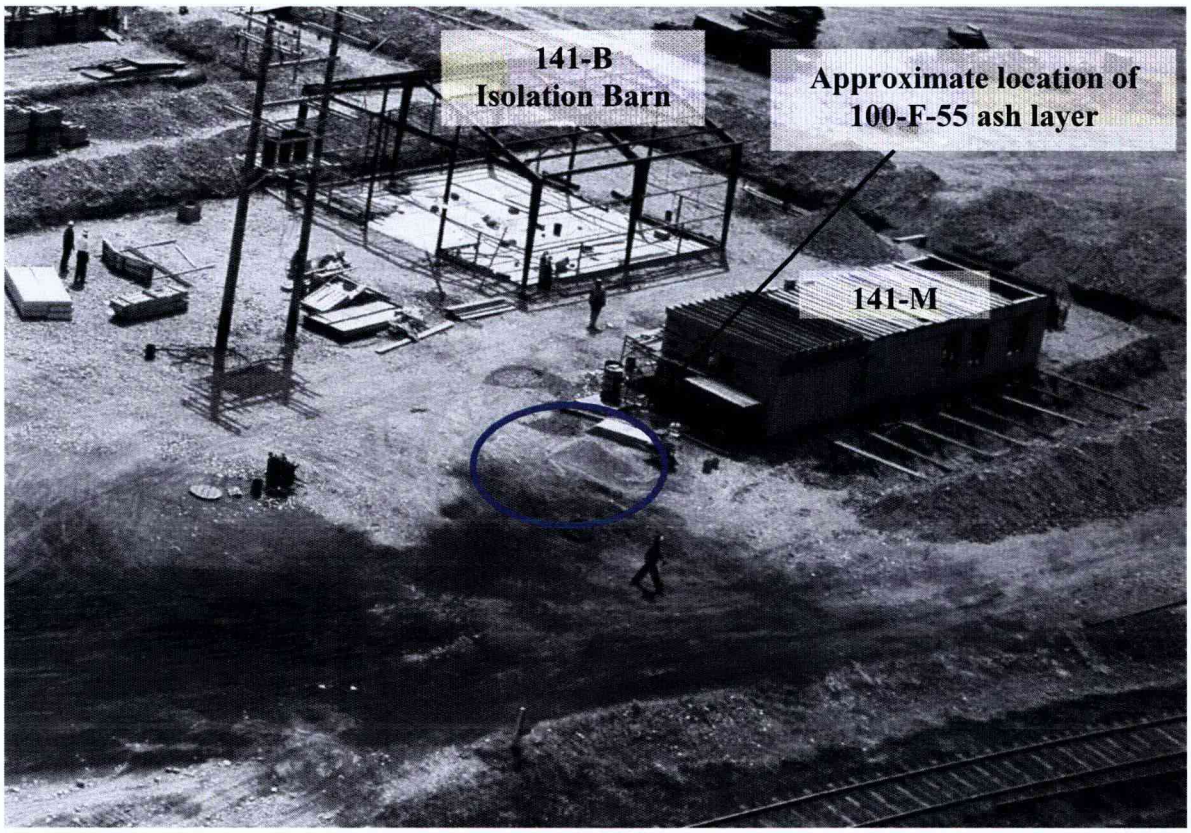
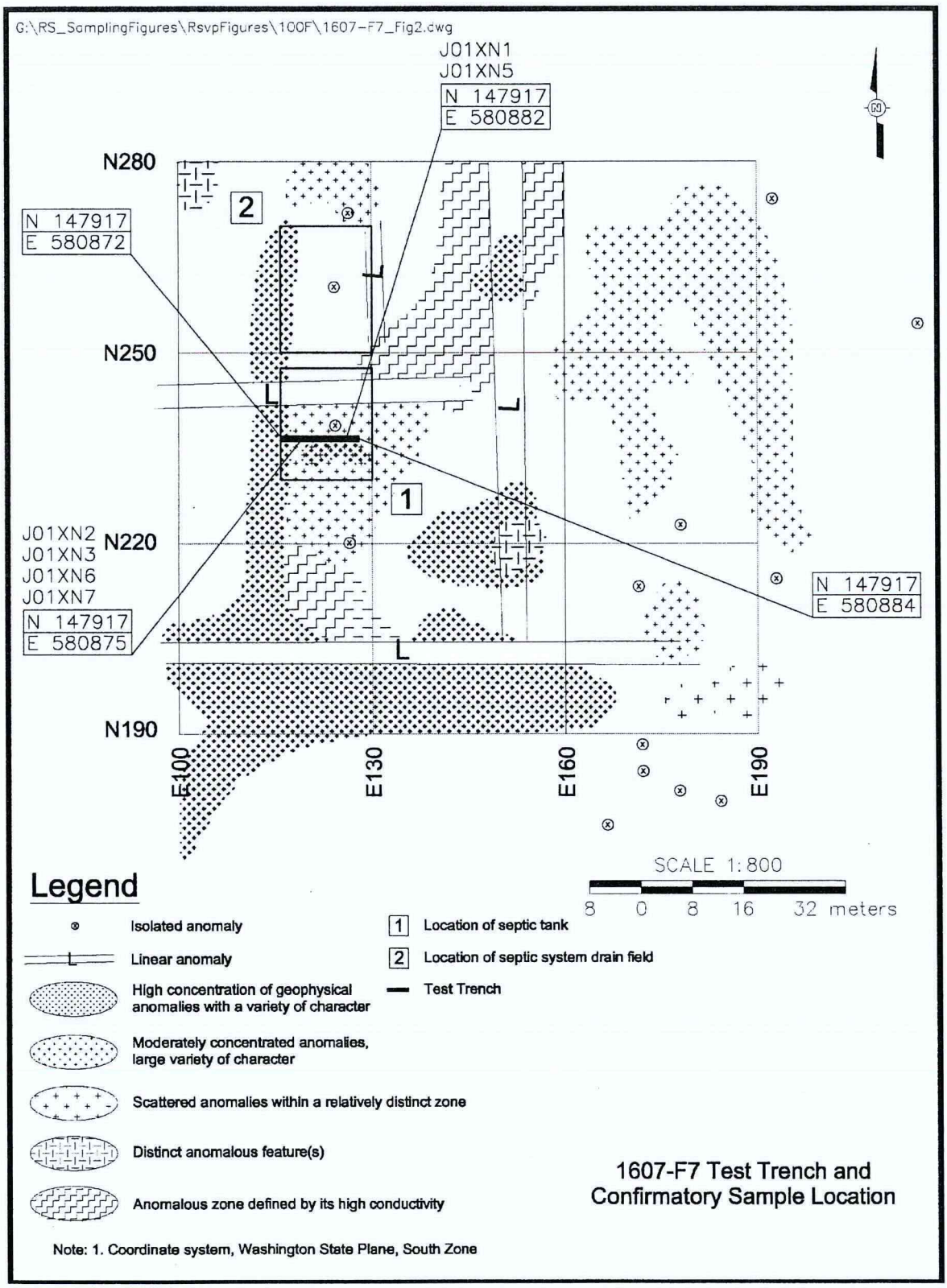


Figure 5. Geophysical Survey of the 1607-F7 Waste Site with Test Trench and Confirmatory Sample Locations.



discovery site 100-F-55 (WCH 2006a). Figure 5 shows the location of the samples; Figure 6 shows the ash layer sample being collected from the test trench wall.

Geophysical Survey

A geophysical survey was performed in 2004 at the 1607-F7 waste site prior to confirmatory sampling to determine the approximate location of the septic tank (Bergstrom et al. 2004). After mapping the surface features of the site, the survey consisted of identifying subsurface anomalous zones using electromagnetic induction and magnetic field surveys (Figure 5). The geophysical survey does not provide an indication of the ash layer, but the septic tank and drain field were identified. Multiple anomalies were found including linear anomalies that may have indicated the 100-F-62 pipelines that were associated with the 1607-F7 septic system (Figure 5).

In addition, a geophysical survey was performed at the 100-F-31 waste site associated with the south 100-F-62 pipeline in 2004 using ground-penetrating radar, electromagnetic induction, and magnetometry (Bergstrom et al. 2004). The survey was successful in identifying the location of the septic tank and drain field; however, there was no clear indication of the 100-F-62 pipeline in the survey.

Figure 6. 100-F-55 Ash Layer Found in 1607-F7 Test Trench (October 6, 2004).

REMEDIAL ACTION SUMMARY

Remedial actions at the 100-F-55 waste site took place between September 16 and October 7, 2010 (Figure 7). The depth of the excavation to remove the ash layer was 0.7 m (2.3 ft), and 15 bank cubic meters (BCM) (19.62 bank cubic yards [BCY]) of contaminated soil and ash was excavated. The waste media was staged north of the excavation prior to disposal at the Environmental Restoration Disposal Facility (ERDF). The 100-F-55 excavation uncovered some concrete chunks and slab, which were removed as part of the 100-F-62 excavation. A post-excavation civil survey was conducted on September 20, 2010, at completion of the 100-F-55 waste site excavation. Figure 8 includes the test trench location and 1607-F7 excavation boundary overlain on the post-excavation civil survey.

Prior to initiation of excavation at the 100-F-62 pipelines, in-process sampling activities investigated the two pipeline locations to determine the waste profile for remedial actions on October 12, 2010 (WCH 2011a). The vitrified clay pipe was located using an excavator, and two samples were taken from the pipe contents and soil adjacent to the pipe approximately 2 m (6 ft) below ground surface (Figure 9). The pipe contents appeared to be soil. Sampling activities then concentrated on locating the cast-iron pipeline leading to the 100-F-31 septic system. The soil at this location appeared to be backfill material. The cast-iron pipeline was not located after digging to 3 m (10 ft) in depth (WCH 2011a). Efforts to find the pipe moved north approximately 10 m (33 ft), where the site was excavated to (4.6 m) 15 ft in depth. The cast-iron pipe was not located in the second attempt (WCH 2011a).

Remediation continued with the start of the 100-F-62 excavation on December 13, 2010, and was concluded March 10, 2011. A total of 594 BCM (777 BCY) of waste media was removed from the north and south excavations (WCH 2011b). Excavated media was stockpiled prior to loadout to ERDF. Four staging pile areas were used for the 100-F-62 excavations. One was located north of the 100-F-62 north excavation, and three were located around the south excavation.

The north excavation included the removal of the pipelines to the former 1607-F7 septic tank and contained the 100-F-55 waste site excavation. From the north excavation, approximately 2 m (7 ft) of the 4-in.-diameter vitrified clay pipe were removed, and approximately 5 m (16 ft) of the 4-in.-diameter steel pipe with lead bells were removed. The north excavation was 1.3 m (4.3 ft) in depth. The south excavation was conducted at the 100-F-62 waste site location for the pipelines to the former 100-F-31 septic tank. No pipes were located during remediation, and the excavation was 2.5 m (8.2 ft) in depth.

Excavation of the 100-F-62 pipelines also uncovered concrete, rebar, ¾-in.-diameter copper pipe sections, shards of broken clay pipe, and asbestos transite pipe chunks, which were disposed with the contaminated soil and pipelines. No anomalous material was encountered during excavation. All waste media was transported to ERDF for disposal. A post-excavation civil survey was conducted at the 100-F-62 waste site on February 11 and March 10, 2011. Figure 10 includes the pipeline locations overlain on the post-excavation civil survey.

Figure 7. Remediation Began at the 100-F-55 Waste Site (September 16, 2010).

Figure 8. Post-Excavation Civil Survey of the 100-F-55 Excavation.

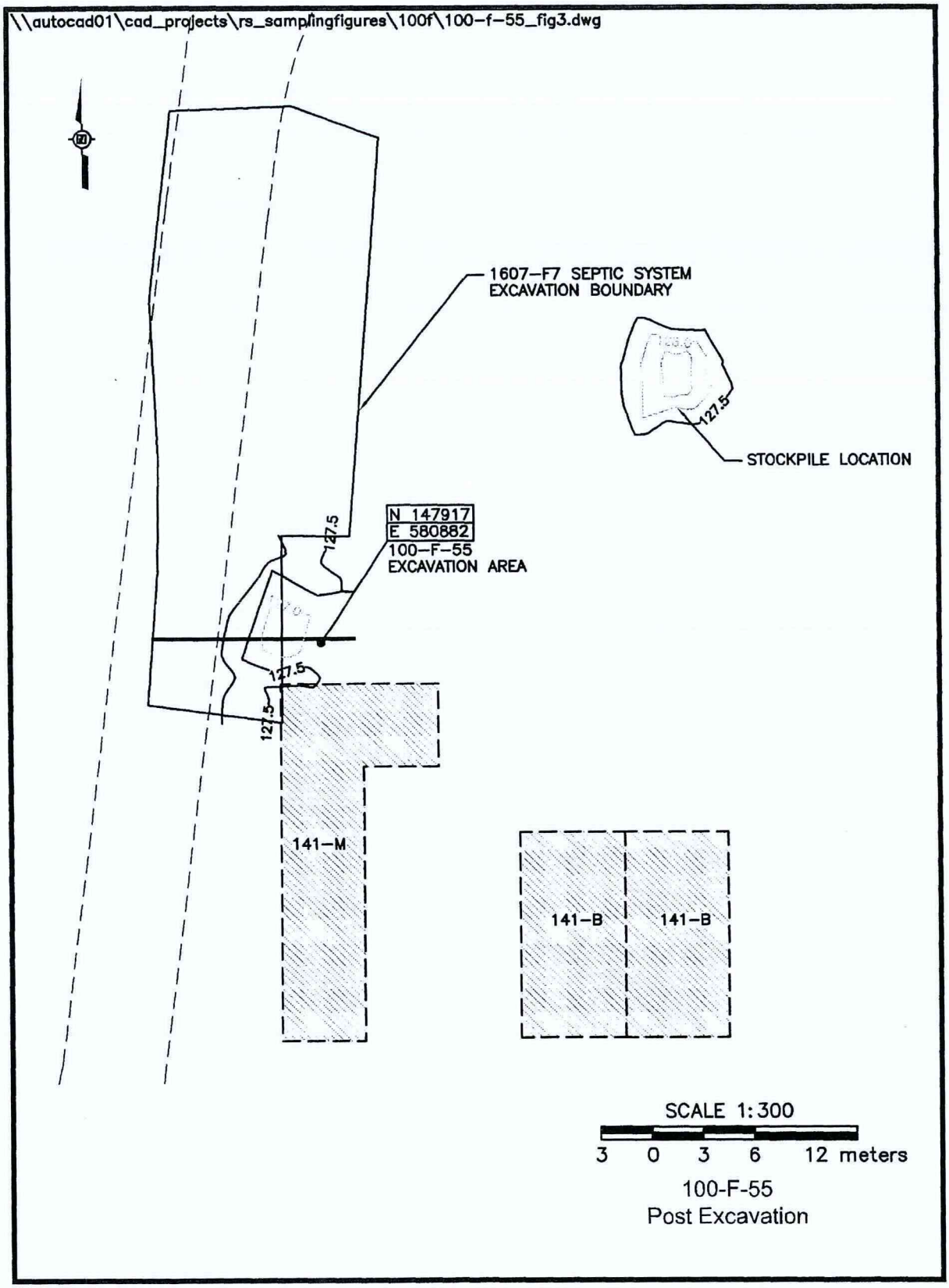
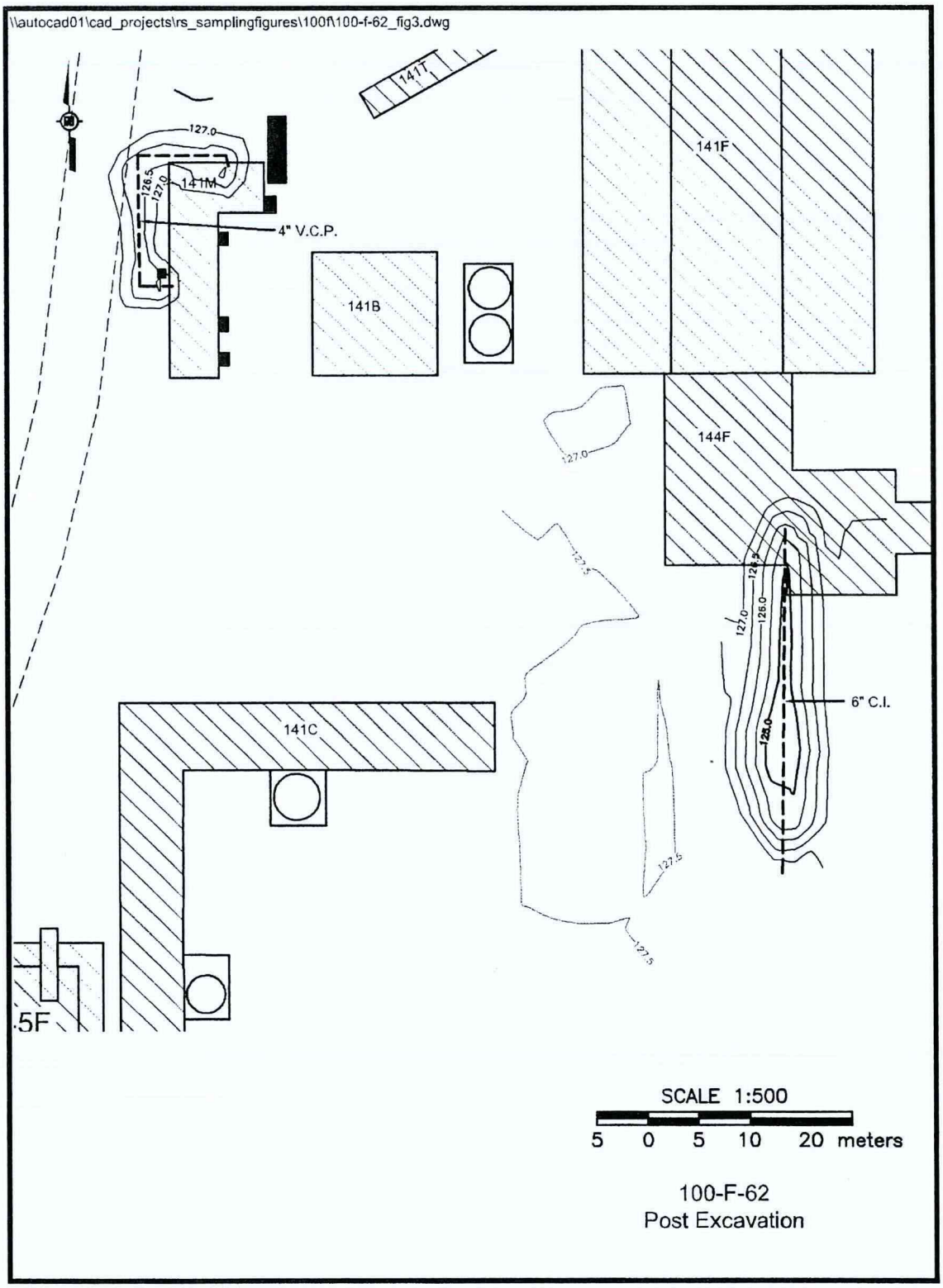


Figure 9. 100-F-62 Vitrified Clay Pipe Located (October 12, 2010).

Figure 10. Post-Excavation Civil Survey of the 100-F-62 Excavation, Including 100-F-55.



Additional Remediation

Following verification sample analysis of the initial remediation, additional excavation was determined necessary to further remediate areas where samples did not meet cleanup criteria. The direct exposure remedial action goal (RAG) of 0.137 mg/kg for benzo(a)pyrene was exceeded at two locations in the north excavation, seven locations in the south excavation, and two locations in the staging pile areas decision unit. The direct exposure RAG of 0.5 mg/kg was exceeded for Aroclor-1248 at two locations in the south excavation decision unit, and the direct exposure RAG of 1.37 mg/kg for benzo(a)anthracene was exceeded at one location in the decision unit. In addition, the direct exposure RAG of 0.0625 mg/kg was exceeded for dieldrin at one location in the north excavation decision unit.

Therefore, with agreement from the U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE), an additional 2 m (6.6 ft) of soil was removed from the south excavation, which extended the excavation to 4.4 m (14.5 ft) in depth (Figure 11). An additional 1 to 2 m (3.3 to 6.6 ft) of soil was removed from the three exceeding sample locations within the center section of the north excavation, and the final depth of the north excavation is 2.3 m (7.6 ft). An additional 1 m (3.3 ft) of soil was removed from the SPA-10 quadrant of the staging pile areas decision unit, and further remediation at the south excavation included the SPA-7 location.

In addition, the south excavation was expanded to the south approximately 10 m (33 ft) to encompass the entire historical extent of the 100-F-62 pipeline as in the original remedial design. This area was not previously remediated because the 100-F-62 south pipeline was not located during remedial action activities. Due to the change in the south excavation boundary and with agreement from DOE and EPA, a focused sample was collected at the location where the 100-F-62 pipeline historically connected to the 100-F-31 septic tank.

The additional remediation was conducted from July 29 to August 9, 2011, and resulted in the removal and disposal of 1,018 BCM (1,301 BCY) of soil material. The removal of extra material from these decision units did not significantly alter the original boundaries for the north excavation and staging pile areas. Only sample locations that previously exceeded cleanup criteria were re-sampled after additional remediation.

Results from re-sampling the SPA-7 location indicated that the direct exposure RAG was exceeded for benzo(a)pyrene. With agreement from DOE and EPA, less than 1 m (3.3 ft) of soil was removed from the east stockpile on August 23, 2011 (WCH 2011c). Re-sampling of the SPA-7 location failed to meet the direct exposure RAG for benzo(a)pyrene. With EPA approval to excavate an additional 2 to 4 m (6.6 to 13.2 ft), the area was remediated on September 1, 2011, and the re-sample results meet the cleanup criteria (WCH 2011d). The final depth of the east stockpile is approximately 2 m (6.6 ft).

Figure 11. South Excavation after Additional Remediation (Looking South, September 1, 2011).

VERIFICATION SAMPLING ACTIVITIES

Verification sampling was conducted at the 100-F-55 and 100-F-62 waste sites 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). The verification sampling was performed on June 29, and July 5, 2011; specific sample locations were re-sampled in August and September 2011(WCH 2011e). The south excavation focused sample was collected on August 16, 2011. The verification sample results are provided within the 95% upper confidence limit (UCL) calculation in Appendix A and indicate that the waste removal action achieved compliance with the remedial action objectives (RAOs) for the 100-F-55 and 100-F-62 waste sites. The following subsections provide additional discussion of the information used to develop the verification sampling design. The statistical results of verification sampling are also summarized to support interim closure of the site. A more detailed discussion of the verification sampling can be found in the *Work Instruction for Verification Sampling of the 100-F-55, 1607-F7 Contaminated Ash Layer and 100-F-62, Animal Farm Septic Lines* (WCH 2011f).

Contaminants of Potential Concern

The contaminants of potential concern (COPCs) for the 100-F-55 and 100-F-62 waste sites were identified based on previous sample results and potential contaminants identified for the 1607-F7 and 100-F-31 septic systems.

The north excavation includes the COPCs identified for the ash layer and for the 1607-F7 septic system. Based on sample results from 1607-F7 confirmatory sampling activities, the COPCs identified for the 100-F-55 Contaminated Ash Layer waste site are hexavalent chromium, pesticides, and polyaromatic hydrocarbons (PAH) (WCH 2007). For the 100-F-62 pipelines to the 1607-F7 septic tank, the COPCs include the expanded list of inductively coupled plasma (ICP) metals, mercury, pesticides, polychlorinated biphenyls (PCBs), PAH, and semivolatile organic compounds (SVOCs), which were identified for verification sampling of the 1607-F7 waste site (WCH 2006a). These COPCs listed for 100-F-55 and 100-F-62 north pipelines were analyzed for in the northern excavation (Decision Unit 1).

Radionuclides were not detected above background levels in sample results for the 1607-F7 confirmatory sample results and were excluded as COPCs for verification sampling (WCH 2006a). Radionuclides are not considered COPCs for the north excavation decision unit and were not analyzed for in the verification samples.

The southern excavation includes COPCs identified for the verification sampling of the 100-F-31 septic system (WCH 2006b). For the 100-F-62 pipeline to the 100-F-31 septic tank, the COPCs include the expanded list of ICP metals, hexavalent chromium, mercury, PCBs, PAH, cesium-137, americium-241, europium-152, and SVOCs. In addition, the staging pile areas were analyzed for all COPCs identified for the north and south excavations.

The COPCs for verification sampling and the laboratory analytical methods are identified in Table 1.

Table 1. Laboratory Analytical Methods.

Analytical Method	Contaminants of Potential Concern
ICP metals [a] – EPA Method 6010	ICP metals
Cr VI – EPA Method 7196	Hexavalent chromium
Mercury – EPA Method 7471	Mercury
PAH – EPA Method 8310	Polycyclic aromatic hydrocarbons
PCB – EPA Method 8082	Polychlorinated biphenyls
SVOA – EPA Method 8270	Semivolatile organic compounds
GEA – gamma spectroscopy	Cesium-137, americium-241, europium-142

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

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

Verification Sample Design

This section describes the basis for selection of an appropriate sample design and determination of the number of verification samples that were collected. All sampling was performed in accordance with the *100 Area Remedial Action Sampling and Analysis Plan* (DOE-RL 2009a). The 100-F-55 and 100-F-62 waste sites are collocated and are included in one sample design. The waste sites have been divided into the following four decision units: the north and south excavation footprints (Decision Units 1 and 2; Figure 12), the south excavation expansion (Decision Unit 3; Figure 13), and the footprint of the waste staging pile areas (Decision Unit 4; Figure 14).

Twelve statistical samples were collected from each excavation footprint, as indicated in Figure 12. Composite, or multi-aliquot, samples were collected from the five staging pile areas. Figure 14 shows the footprints of the five staging pile areas with the quadrants and sections of each area delineated where composite samples were collected. The approximate center WSP coordinates of each section has been provided in Table 2. In addition, one focused sample was collected from the south excavation expansion as indicated in Figure 13, which is the location where the 100-F-62 pipeline historically connected to the 100-F-31 septic tank.

In the verification work instruction (WCH 2011f), the Northing and Easting coordinates had mistakenly been alternated for all sample locations, and the correct orientation is presented in Table 2. A duplicate sample was collected from decision units 1, 2, and 4. The HEIS numbers for each sample are provided in Table 2. All sampling was performed in accordance with ENV-1, *Environmental Monitoring & Management*, to fulfill the requirements of the *100 Area Remedial Action Sampling and Analysis Plan* (SAP) (DOE-RL 2009a).

Figure 12. Verification Sample Locations for the 100-F-55 and 100-F-62 North and South Excavation Footprints.

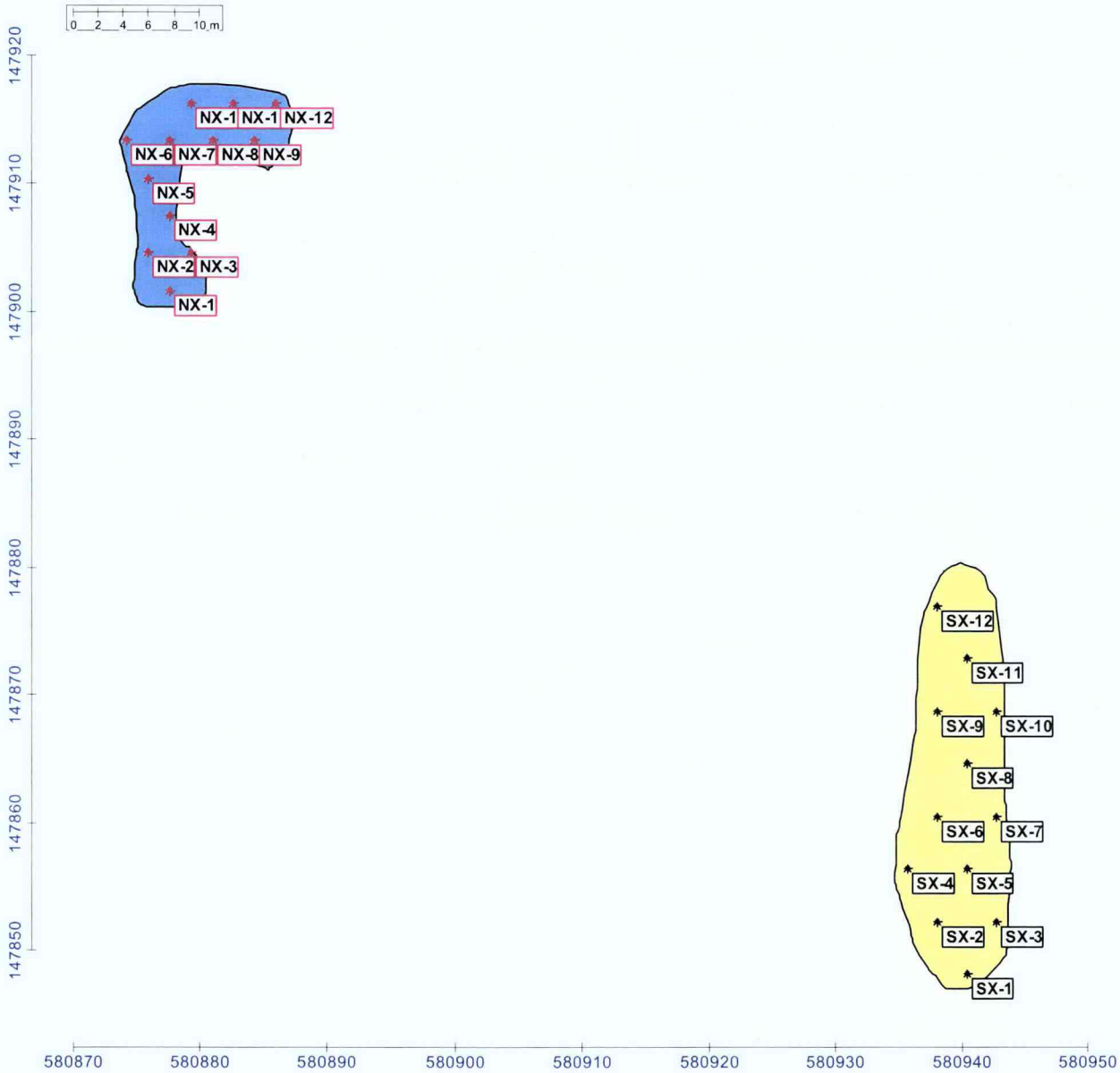


Figure 13. 100-F-62 South Excavation Expansion with Focused Sample Location.

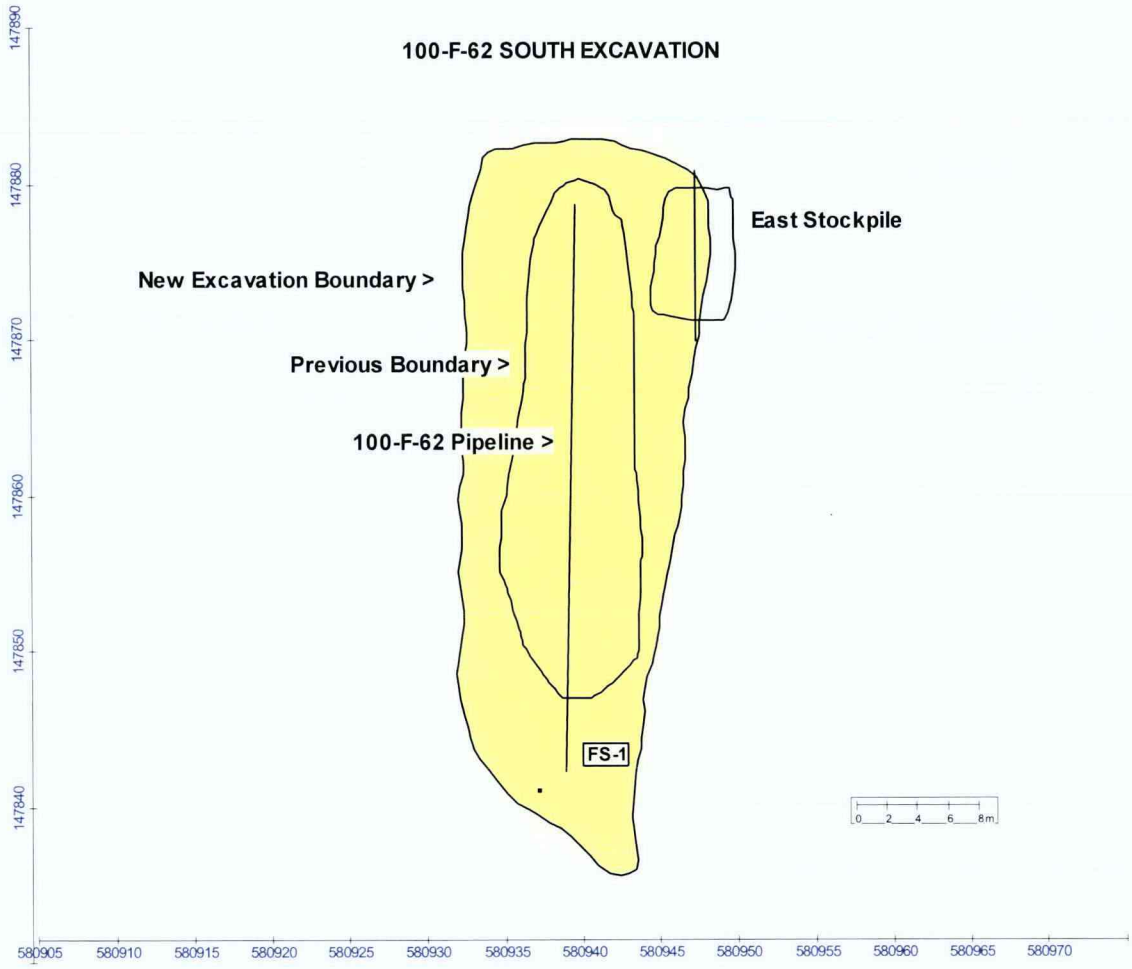


Figure 14. Verification Sample Locations for 100-F-55 and 100-F-62 Staging Pile Areas.

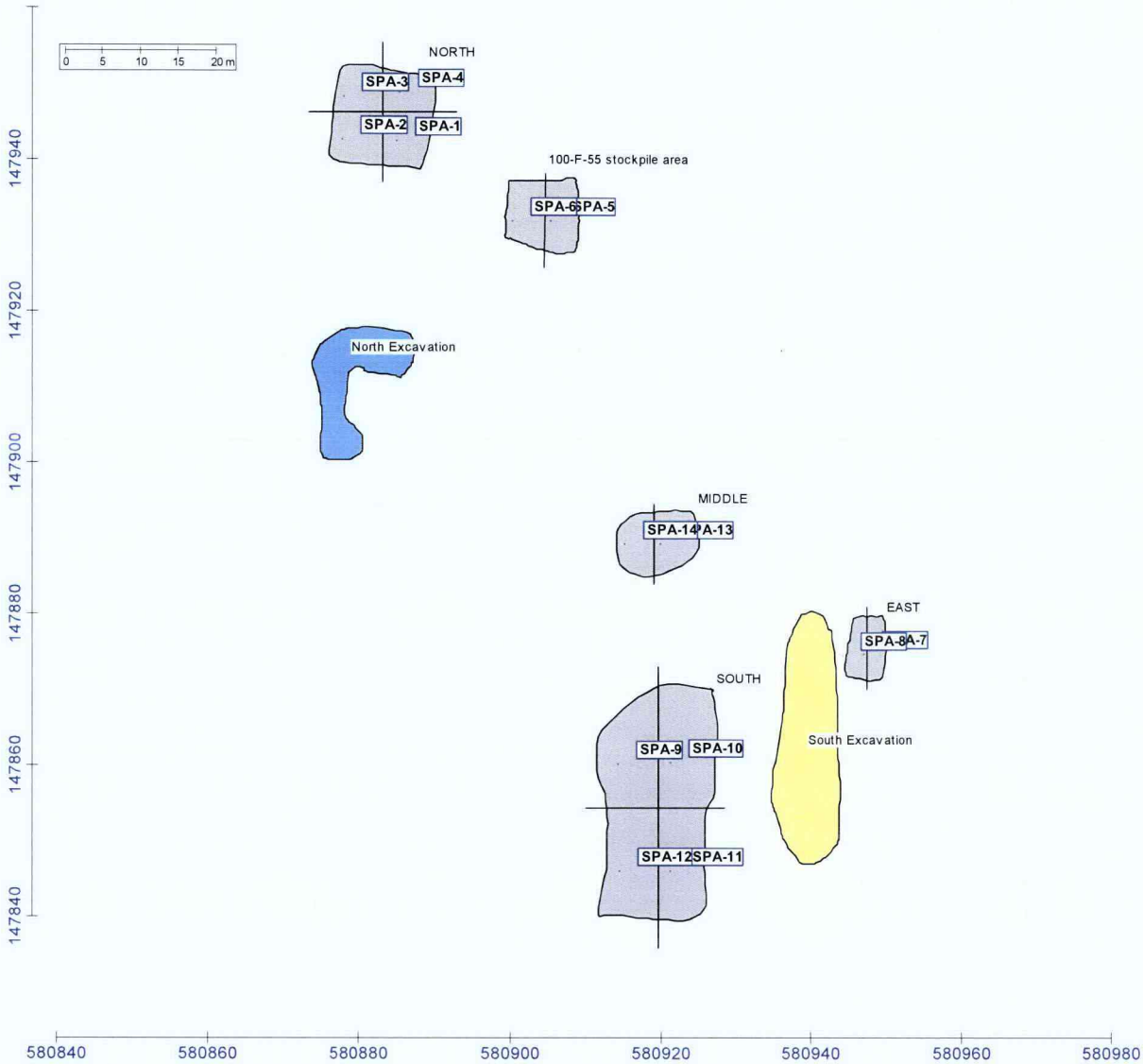


Table 2. 100-F-55 and 100-F-62 Verification Sampling Summary. (2 Pages)

Sample Location	HEIS Sample Number	Washington State Plane Coordinates		Sample Analysis
		Northing	Easting	
NX-1	J1K3N2	147901.0	580875.8	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, PAH, pesticides
NX-2	J1K3N3	147901.0	580879.2	
NX-3	J1K3N4	147903.9	580877.5	
NX-4	J1K3N5	147906.8	580875.8	
NX-4 Resample [b]	J1KNK0	147906.8	580875.8	
NX-5	J1K3N6	147909.7	580877.5	
NX-5 Resample [b]	J1KNK1	147909.7	580877.5	
NX-6	J1K3N7	147912.7	580875.8	
NX-7	J1K3N8	147912.7	580879.2	
NX-8	J1K3N9	147912.7	580882.5	
NX-9	J1K3P0	147912.7	580885.9	
NX-10	J1K3P1	147915.6	580877.5	
NX-10 Resample [b]	J1KNK2	147915.6	580877.5	
NX-11	J1K3P2	147915.6	580880.8	
NX-12	J1K3P3	147915.6	580884.2	
NX-9 Duplicate [c]	J1K3P4	147912.7	580885.9	
SX-1	J1K3T3	147847.8	580941.1	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, PAH, GEA
SX-2	J1K3T4	147851.9	580938.7	
SX-2 Resample [d]	J1KNK5	147851.9	580938.7	
SX-3	J1K3T5	147851.9	580943.4	
SX-3 Resample [d]	J1KNK6	147851.9	580943.4	
SX-4	J1K3T6	147856.0	580936.3	
SX-5	J1K3T7	147856.0	580941.1	
SX-6	J1K3T8	147860.1	580938.7	
SX-6 Resample [d]	J1KNK7	147860.1	580938.7	
SX-7	J1K3T9	147860.1	580943.4	
SX-7 Resample [d]	J1KNK8	147860.1	580943.4	
SX-8	J1K3V0	147864.2	580936.3	
SX-9	J1K3V1	147864.2	580941.1	
SX-9 Resample [d]	J1KNK9	147864.2	580941.1	
SX-10	J1K3V2	147868.4	580938.7	
SX-10 Resample [d]	J1KNL0	147868.4	580938.7	
SX-11	J1K3V3	147872.5	580941.1	
SX-12	J1K3V4	147576.6	580938.7	
SX-12 Resample [d]	J1KNL1	147576.6	580938.7	
SX-12 Duplicate [c]	J1K3V5	147576.6	580938.7	
SX-12 Duplicate [c] Resample [d]	J1KNL2	147576.6	580938.7	
FS-1	J1KPJ9	147842.2	580938.9	
North Stockpile				ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, PAH, pesticides, GEA
SPA-1	J1K3R4	147943.1	580886.6	
SPA-1 Duplicate [c]	J1K3T0	147943.1	580886.6	
SPA-2	J1K3R5	147943.3	580879.4	
SPA-3	J1K3R6	147948.9	580879.5	
SPA-4	J1K3R7	147949.5	580886.9	
100-F-55 Stockpile				
SPA-5	J1K3R8	147932.6	580907.0	
SPA-6	J1K3R9	147932.5	580901.8	

Table 2. 100-F-55 and 100-F-62 Verification Sampling Summary. (2 Pages)

Sample Location	HEIS Sample Number	Washington State Plane Coordinates		Sample Analysis
		Northing	Easting	
East Stockpile				
SPA-7	J1K3V6	147875.4	580948.6	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, PAH, pesticides, GEA
SPA-7 Resample I [b]	J1KNK3	147875.4	580948.6	
SPA-7 Resample II [b]	J1KTJ6	147875.4	580948.6	
SPA-7 Resample III [b]	J1L863	147875.4	580948.6	
SPA-8	J1K3V7	147875.2	580945.7	
SPA-8 Duplicate [c]	J1K3W4	147875.2	580945.7	
South Stockpile				
SPA-9	J1K3V8	147861.0	580915.8	ICP metals [a], mercury, hexavalent chromium, PCBs, SVOA, PAH, pesticides, GEA
SPA-10	J1K3V9	147861.1	580922.8	
SPA-10 Resample [b]	J1KNK4	147861.1	580922.8	
SPA-11	J1K3W0	147846.8	580922.7	
SPA-12	J1K3W1	147846.8	580916.1	
Middle Stockpile				
SPA-13	J1K3W2	147889.9	580921.5	
SPA-14	J1K3W3	147889.9	580916.8	
Equipment blank	J1K3P5	NA	NA	ICP metals [a], mercury, SVOA
Equipment blank	J1K3W5	NA	NA	

Source: Field logbook EL-1651-01 (WCH 2011e).

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

[b] Locations resampled in the north excavation (NX) and staging pile areas (SPA) for SVOA, PAH, PCBs, and pesticides only, due to exceedance of cleanup criteria. SPA-7 resampled again for SVOA and PAH only, due to exceedance of cleanup criteria.

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

[d] Locations resampled in the south excavation (SX) were analyzed for SVOA, PAH, and PCBs only, due to exceedance of cleanup criteria.

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

Verification Sample Results

Verification samples were analyzed using EPA-approved analytical methods. The 95% upper confidence limit (UCL) on the true population mean for residual concentrations of COPCs were calculated for the north excavation footprint and south excavation footprint decision units as specified by the RDR/RAWP (DOE-RL 2009b), with calculations provided in Appendix A. When a nonradionuclide COPC was detected in fewer than 50% of the verification samples collected for the area, the maximum detected value was used for comparison to 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. Evaluation of the verification data from the south excavation focused sample was performed by direct comparison of the sample results against cleanup criteria. Evaluation of the verification data from the waste staging pile areas composite samples was performed by direct comparison of the maximum sample results against cleanup criteria.

Comparisons of the results for each COPC from the 100-F-55 and 100-F-62 decision units against RAGs are summarized in Table 3, 4, 5 and 6. Contaminants that were not detected by laboratory analysis are excluded from these tables. Calculated cleanup levels are not presented in the Cleanup Levels and Risk Calculations Database (Ecology 2011) under *Washington*

Table 3. Comparison of Statistical Values to Action Levels for the 100-F-55 and 100-F-62 North Excavation Footprint Verification Samples. (2 Pages)

COPC	Maximum or Statistical Result (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Result Exceed RAGs?	Does the Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Metals						
Arsenic	3.3 (<BG)	20 [b]	20 [b]	20 [b]	No	--
Barium	104 (<BG)	5,600	200	400	No	--
Beryllium	0.29 (<BG)	10.4 [c]	1.51 [b]	1.51 [b]	No	--
Boron [d]	2.3	7,200	320	-- [e]	No	--
Cadmium [f]	0.14 (<BG)	13.9 [c]	0.81 [b]	0.81 [b]	No	--
Chromium	12.4 (<BG)	80,000	18.5 [b]	18.5 [b]	No	--
Cobalt	6.9 (<BG)	24	15.7 [b]	-- [e]	No	--
Copper	17.0 (<BG)	2,960	59.2	22.0 [b]	No	--
Lead	36.0	353	10.2 [b]	10.2 [b]	Yes	Yes [g]
Manganese	326 (<BG)	3,760	512 [b]	512 [b]	No	--
Mercury	0.027 (<BG)	24	0.33 [b]	0.33 [b]	No	--
Molybdenum [d]	0.26	400	8	-- [e]	No	--
Nickel	12.0 (<BG)	1,600	19.1 [b]	27.4	No	--
Vanadium	42.8 (<BG)	560	85.1 [b]	-- [e]	No	--
Zinc	53.9 (<BG)	24,000	480	67.8 [b]	No	--
Polychlorinated Biphenyls (PCBs)						
Aroclor-1260	0.046	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Pesticides						
Chlordane (alpha- and gamma-)	0.046	2.86	0.025	0.0165 [h]	Yes	Yes [g]
DDE, 4,4'-	0.0069	2.94	0.0257	0.0033 [h]	Yes	Yes [g]
DDT, 4,4'-	0.0074	2.94	0.0257	0.0033 [h]	Yes	Yes [g]
Dieldrin	0.037	0.0625	0.0033 [h]	0.0033 [h]	Yes	Yes [g]
Organics						
Acenaphthene	0.016	4,800	96	129	No	--
Acenaphthylene [i]	0.027	4,800	96	129	No	--
Anthracene	0.015	24,000	240	1,920	No	--
Benzo(a)anthracene	0.172	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(a)pyrene	0.127	0.137	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(b)fluoranthene	0.149	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(ghi)perylene [i]	0.048	2,400	48	192	No	--
Benzo(k)fluoranthene	0.031	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Bis(2-ethylhexyl) phthalate	0.211	71.4	0.6	0.36	No	--
Chrysene	0.161	13.7	0.12	0.1 [h]	Yes	Yes [g]
Dibenz(a,h)anthracene	0.018	1.37	0.03 [h]	0.03 [h]	No	--
Di-n-butylphthalate	0.12	8,000	160	540	No	--
Fluoranthene	0.192	3,200	64	18.0	No	--
Fluorene	0.017	3,200	64	260	No	--
Indeno(1,2,3-cd)pyrene	0.063	1.37	0.33 [h]	0.33 [h]	No	--
Phenanthrene [i]	0.062	24,000	240	1,920	No	--
Phenol	0.025	24,000	480	4,200	No	--

Table 3. Comparison of Statistical Values to Action Levels for the 100-F-55 and 100-F-62 North Excavation Footprint Verification Samples. (2 Pages)

COPC	Maximum or Statistical Result (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Result Exceed RAGs?	Does the Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Pyrene	0.182	2,400	48	192	No	--

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

[b] 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 2009b).

[c] 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]).

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

[e] 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]).

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

[g] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of lead, chlordane (alpha- and gamma-), 4,4'-DDE, 4,4'-DDT, dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and aroclor-1260 are not predicted to migrate more than 3 m (9.8 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 25.6 mL/g for dieldrin). The vadose zone underlying the soil below the site is approximately 11.2 m (36.7 ft) thick based on an elevation of 124.7 m (409.1 ft) at the deepest portion of the north excavation and a groundwater elevation of 113.5 m (372.4 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

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

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

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

Table 4. Comparison of Statistical Values to Action Levels for the 100-F-62 South Excavation Footprint Verification Samples. (2 Pages)

COPC	Maximum Result (pCi/g)	Soil Lookup Values (pCi/g) [a]			Does the Statistical Result Exceed Lookup Values?	Do the Results Pass RESRAD Modeling?
		Shallow Zone Lookup Value	Soil Lookup Value for Groundwater Protection	Soil Lookup Value for River Protection		
Cesium-137	0.023	6.2	1,465	2,930	No	--
COPC	**Statistical or Maximum Result (mg/kg)**	**Remedial Action Goals (mg/kg) [a]**			**Does the Statistical Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Does the Statistical Result Exceed RAGs?	**Does the Statistical Result Pass RESRAD Modeling?**	**Does the Statistical Result Exceed RAGs?**		
Metals						
Arsenic	3.0 (<BG)	20 [b]	20 [b]	20 [b]	No	--
Barium	87.8 (<BG)	5,600	200	400	No	--
Beryllium	0.14 (<BG)	10.4 [c]	1.51 [b]	1.51 [b]	No	--
Boron [d]	4.1	7,200	320	-- [e]	No	--
Cadmium [f]	0.097 (<BG)	13.9 [c]	0.81 [b]	0.81 [b]	No	--
Chromium	11.6 (<BG)	80,000	18.5 [b]	18.5 [b]	No	--
Cobalt	6.4 (<BG)	24	15.7 [b]	-- [e]	No	--
Copper	13.4 (<BG)	2,960	59.2	22.0 [b]	No	--
Lead	5.7 (<BG)	353	10.2 [b]	10.2 [b]	No	--
Manganese	257 (<BG)	3,760	512 [b]	512 [b]	No	--
Mercury	6.8	24	0.33 [b]	0.33 [b]	Yes	Yes [g]
Molybdenum [d]	0.25	400	8	-- [e]	No	--
Nickel	12.6 (<BG)	1,600	19.1 [b]	27.4	No	--
Vanadium	39.2 (<BG)	560	85.1 [b]	-- [e]	No	--
Zinc	48.7 (<BG)	24,000	480	67.8 [b]	No	--
Polychlorinated Biphenyls (PCBs)						
Aroclor-1248	0.24	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Aroclor-1254	0.024	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Aroclor-1260	0.0085	0.5	0.017 [h]	0.017 [h]	No	--
Total PCBs	0.2725	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Organics						
Anthracene	0.012	24,000	240	1,920	No	--
Benzo(a)anthracene	0.071	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(a)pyrene	0.082	0.137	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(b)fluoranthene	0.196	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(ghi)perylene [i]	0.039	2,400	48	192	No	--
Benzo(k)fluoranthene	0.087	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Chrysene	0.44	13.7	0.12	0.1 [h]	Yes	Yes [g]
Dibenz(a,h)anthracene	0.023	1.37	0.03 [h]	0.03 [h]	No	--
Fluoranthene	0.492	3,200	64	18.0	No	--
Fluorene	0.016	3,200	64	260	No	--
Indeno(1,2,3-cd)pyrene	0.052	1.37	0.33 [h]	0.33 [h]	No	--
Phenanthrene [i]	0.043	24,000	240	1920	No	--
Phenol	0.035	24,000	480	4,200	No	--

Table 4. Comparison of Statistical Values to Action Levels for the 100-F-62 South Excavation Footprint Verification Samples. (2 Pages)

COPC	Statistical or Maximum Result (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?	Does the Statistical Result Exceed RAGs?		
Pyrene	0.709	2,400	48	192	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] 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 2009b).

[c] 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]).

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

[e] 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]).

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

[g] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of mercury, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, aroclor-1248, and aroclor-1254 are not predicted to migrate more than 2 m (6.6 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for mercury). The vadose zone underlying the soil below the site is approximately 9.1 m (29.9 ft) thick based on an elevation of 122.6 m (402.2 ft) at the deepest portion of the south excavation and a groundwater elevation of 113.5 m (372.4 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

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

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

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

Table 5. Comparison of Values to Action Levels for the 100-F-62 South Excavation Focused Sample.

COPC	Result (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Statistical Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Antimony	0.66 (<BG)	32	5 [b]	5 [b]	No	--
Arsenic	2.1 (<BG)	20 [b]	20 [b]	20 [b]	No	--
Barium	48.6 (<BG)	5,600	200	400	No	--
Beryllium	0.038 (<BG)	10.4 [c]	1.51 [b]	1.51 [b]	No	--
Boron [d]	1.2	7,200	320	-- [e]	No	--
Cadmium [f]	0.076 (<BG)	13.9 [c]	0.81 [b]	0.81 [b]	No	--
Chromium	10.8 (<BG)	80,000	18.5 [b]	18.5 [b]	No	--
Cobalt	5.9 (<BG)	24	15.7 [b]	-- [e]	No	--
Copper	13 (<BG)	2,960	59.2	22.0 [b]	No	--
Lead	4.7 (<BG)	353	10.2 [b]	10.2 [b]	No	--
Manganese	286 (<BG)	3,760	512 [b]	512 [b]	No	--
Nickel	10.4 (<BG)	1,600	19.1 [b]	27.4	No	--
Vanadium	42 (<BG)	560	85.1 [b]	-- [e]	No	--
Zinc	34.5 (<BG)	24,000	480	67.8 [b]	No	--
Benzo(a)pyrene	0.0084	0.137	0.015 [g]	0.015 [g]	No	--
Benzo(b)fluoranthene	0.0047	1.37	0.015 [g]	0.015 [g]	No	--
Benzo(k)fluoranthene	0.0063	1.37	0.015 [g]	0.015 [g]	No	--
Chrysene	0.0067	13.7	0.12	0.1 [g]	No	--
Aroclor-1254	0.0049	0.5	0.017 [g]	0.017 [g]	No	--

[a] RAGs obtained from the RDR/RAWP (DOE-RL 2009b) unless otherwise noted.
[b] 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 2009b).
[c] 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]).
[d] No Hanford Site-specific or Washington State background value is available.
[e] 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]).
[f] Hanford Site-specific background not available. Value is Washington State background from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).
[g] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on approved analytical methods that may not be available for rapid turnaround analysis. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

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

Table 6. Comparison of Maximum Values to Action Levels for the 100-F-55 and 100-F-62 Waste Staging Pile Areas Verification Samples. (2 Pages)

COPC	Maximum Result (pCi/g)	Soil Lookup Values (pCi/g) [a]			Does the Maximum Result Exceed Lookup Values?	Do the Results Pass RESRAD Modeling?
		Shallow Zone Lookup Value	Soil Lookup Value for Groundwater Protection	Soil Lookup Value for River Protection		
Cesium-137	0.137	6.2	1,465	2,930	No	--
COPC	**Maximum Result (mg/kg)**	**Remedial Action Goals (mg/kg) [a]**			**Does the Maximum Result Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Metals						
Arsenic	3.9 (<BG)	20 [b]	20 [b]	20 [b]	No	--
Barium	157	5,600	200	400	No	--
Beryllium	0.33 (<BG)	10.4 [c]	1.51 [b]	1.51 [b]	No	--
Boron [d]	8.3	7,200	320	-- [e]	No	--
Cadmium [f]	0.27 (<BG)	13.9 [c]	0.81 [b]	0.81 [b]	No	--
Chromium	16.9 (<BG)	80,000	18.5 [b]	18.5 [b]	No	--
Cobalt	7.3 (<BG)	24	15.7 [b]	-- [e]	No	--
Copper	18.2 (<BG)	2,960	59.2	22.0 [b]	No	--
Hexavalent chromium [d]	0.749	2.1 [c]	4.8	2	No	--
Lead	19.5	353	10.2 [b]	10.2 [b]	Yes	Yes [g]
Manganese	340 (<BG)	3,760	512 [b]	512 [b]	No	--
Mercury	0.69	24	0.33 [b]	0.33 [b]	Yes	Yes [g]
Molybdenum [d]	0.39	400	8	-- [e]	No	--
Nickel	15 (<BG)	1,600	19.1 [b]	27.4	No	--
Silver	0.97	400	8	0.73 [b]	Yes	Yes [g]
Vanadium	42.6 (<BG)	560	85.1 [b]	-- [e]	No	--
Zinc	74.8	24,000	480	67.8 [b]	Yes	Yes [g]
Polychlorinated Biphenyls (PCBs)						
Aroclor-1248	0.025	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Aroclor-1254	0.019	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Aroclor-1260	0.022	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Total PCBs	0.066	0.5	0.017 [h]	0.017 [h]	Yes	Yes [g]
Pesticides						
Chlordane (alpha- and gamma-)	0.00172	2.86	0.025	0.0165 [h]	No	--
Dieldrin	0.003	0.0625	0.0033 [h]	0.0033 [h]	No	--
Organics						
Anthracene	0.026	24,000	240	1,920	No	--
Benzo(a)anthracene	0.11	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(a)pyrene	0.086	0.137	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(b)fluoranthene	0.062	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Benzo(ghi)perylene [i]	0.027	2,400	48	192	No	--
Benzo(k)fluoranthene	0.043	1.37	0.015 [h]	0.015 [h]	Yes	Yes [g]
Bis(2-ethylhexyl) phthalate	0.069	71.4	0.6	0.36	No	--
Chrysene	0.10	13.7	0.12	0.1 [h]	No	--
Di-n-octylphthalate	0.068	1,600	32	-- [e]	No	--
Fluoranthene	0.20	3,200	64	18.0	No	--

Table 6. Comparison of Maximum Values to Action Levels for the 100-F-55 and 100-F-62 Waste Staging Pile Areas Verification Samples. (2 Pages)

COPC	Maximum Result (mg/kg)	Remedial Action Goals (mg/kg) [a]			Does the Maximum Result Exceed RAGs?	Does the Statistical Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Fluorene	0.016	3,200	64	260	No	--
Indeno(1,2,3-cd)pyrene	0.049	1.37	0.33 [h]	0.33 [h]	No	--
Phenanthrene [i]	0.093	24,000	240	1,920	No	--
Phenol	0.08	24,000	480	4,200	No	--
Pyrene	0.16	2,400	48	192	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] 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 2009b).

[c] 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]).

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

[e] 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]).

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

[g] Based on RESRAD modeling discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentration of lead, mercury, silver, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, aroclor-1248, aroclor-1254, and aroclor-1260 are not predicted to migrate more than 2 m (6.6 ft) vertically within 1,000 years (based on the contaminant with the lowest distribution coefficient of 30 mL/g for lead, mercury, and zinc). The vadose zone underlying the soil below the site is approximately 11.5 m (37.7 ft) thick based on the lowest elevation of 125 m (410 ft) in the staging pile areas and a groundwater elevation of 113.5 m (372.4 ft). Therefore, residual concentrations of all constituents are predicted to be protective of groundwater and the Columbia River.

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

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

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

Administrative Code 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. Method 8310 is specifically meant to analyze for PAH, and the data from this method was used preferentially over method 8270 (SVOC). The laboratory-reported data results for all constituents are stored in the Environmental Restoration project-specific database prior to archival in the HEIS, and are presented in Attachment 1 of the 95% UCL calculations (Appendix A).

DATA EVALUATION

This section demonstrates that contaminant concentrations at the 100-F-55 and 100-F-62 waste sites achieve the applicable RAGs developed to support unrestricted land use at the 100 Area as established in the Remaining Sites ROD (EPA 1999) and documented in the RDR/RAWP (DOE-RL 2009b). Tables 3, 4, 5, and 6, compare the verification sample values to the applicable soil RAGs for direct exposure, protection of groundwater, and protection of the Columbia River.

Nonradionuclide Soil RAGs for Direct Exposure and Groundwater and River Protection Attained

Evaluation of the results listed in Tables 3, 4, 5, and 6, from the verification sampling at the 100-F-55 and 100-F-62 waste sites indicate that no contaminants exceed direct exposure RAGs. Soil RAGs for groundwater and/or the Columbia River protection are exceeded by the following contaminants: lead, mercury, silver, zinc, chlordane (alpha- and gamma-), 4,4'-DDE, 4,4'-DDT, dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, aroclor-1248, aroclor-1254, and aroclor-1260. Based on RESRAD modeling, discussed in Appendix C of the RDR/RAWP (DOE-RL 2009b), the residual concentrations of these contaminants are not expected to migrate more than 3 m (9.8 ft) vertically in 1,000 years (based on the lowest distribution coefficient [dieldrin with a Kd of 25.6 mL/g] of the contaminants exceeding RAGs). The vadose zone underlying the deepest part of the north and south excavations is approximately 9.1 m (29.9 ft) thick; therefore, residual concentrations of these constituents are predicted to be protective of groundwater. The only pathway for contaminant migration to the Columbia River is via groundwater; therefore, residual concentrations of these contaminants are also predicted to be protective of the Columbia River. All other cleanup verification data values pass in direct comparison to the applicable RAGs.

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}. 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 levels. 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 3.5×10^{-1}. The carcinogenic risk value for the carcinogenic constituents above background or detected levels is 2.9×10^{-6}, which is less than the criteria of 1×10^{-5}. As demonstrated in Appendix A, the 100-F-55 and 100-F-62 waste sites meet the requirements for the direct contact hazard quotient and excess carcinogenic risk.

Three-Part Test for Nonradionuclides

A RAG requirement for nonradionuclides is the WAC 173-340-740(7)(e) three-part test, which consists of the following criteria: (1) the cleanup verification 95% upper confidence limit value must be less than the cleanup level, (2) no single detection can exceed two times the cleanup

criteria, and (3) the percentage of samples exceeding the cleanup criteria must be less than 10% of the data set.

The application of the three-part test for the 100-F-55 and 100-F-62 waste sites is included in the statistical calculations (Appendix A). The results of this evaluation indicate that all residual COPC concentrations pass the three-part test in comparison to applicable RAGs, with the exception of the following constituents in comparison to the soil RAGs for groundwater and river protection: lead, dieldrin, chlordane (alpha- and gamma-), aroclor-1260 (in the north excavation); mercury (in the south excavation); benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene (in both excavations).

In the north excavation decision unit, the aroclor-1260 data set fails the second component of the WAC 173-340-740(7)(e) three-part test in comparison against the most stringent soil RAG for groundwater and river protection. In one or more decision units, the lead, mercury, dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene data sets fail the second and third components of the WAC 173-340-740(7)(e) three-part test in comparison against the most stringent soil RAG for groundwater and river protection. However, as described above, residual concentrations of these COPCs are not predicted to migrate to groundwater within 1,000 years, and are therefore protective of groundwater and the Columbia River and meet the requirements of the three-part test.

Attainment of Radionuclide Direct Exposure RAGs

All radionuclide COPCs were undetected at the 100-F-55 and 100-F-62 waste sites, with the exception of cesium-137, which was detected at a level below background. Therefore, the waste sites attain the RAG requirement of a dose rate less that 15 mrem/yr above background.

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the verification sampling approach (WCH 2011f), the field logbook (WCH 2011e), and resulting analytical data with the sampling and data quality requirements specified by the project objectives and performance specifications.

During the DQA, it was noted the field sample data for 4,4'-DDD in sample delivery group (SDG) J01152, and the 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol data in SDG JP0265, required rejection by the project. However, the data quality assessment (Appendix B) concluded that the resulting data set is sufficient for decision making purposes, and the usable 4,4'-DDD, 4,6-dinitro-2-methylphenol, and 2,4-dinitrophenol results from the other decision units meet the applicable remedial action objectives for the 100-F-55 and 100-F-62 waste sites set forth in the RDR/RAWP (DOE-RL 2009b).

The DQA for the 100-F-55 and 100-F-62 waste sites established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances, with the exception of the above-mentioned rejected data. 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 Environmental Restoration (ENRE) project-specific database for data evaluation prior to archival in the HEIS and are summarized in an attachment to the UCL calculation in Appendix A. The detailed DQA is presented in Appendix B.

SUMMARY FOR INTERIM CLOSURE

The 100-F-55 and 100-F-62 waste sites have been evaluated in accordance with the Remaining Sites ROD (EPA 1999) and the RDR/RAWP (DOE-RL 2009b). Verification sampling was performed, and the analytical results indicate that the residual concentrations of COPCs at this site meet the RAOs and associated RAGs for direct exposure, groundwater protection, and river protection. In accordance with this evaluation, the verification sampling results support a reclassification of the 100-F-55 and 100-F-62 waste sites to Interim Closed Out. The results of verification sampling 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 waste sites' contamination does not extend into the deep zone; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone of the site are not required.

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APPENDIX A

95% UPPER CONFIDENCE LIMIT CALCULATIONS AND VERIFICATION SAMPLING RESULTS

DIRECT CONTACT HAZARD QUOTIENT AND CARCINOGENIC RISK CALCULATIONS FOR THE 100-F-55 AND 100-F-62 WASTE SITES

APPENDIX A

CALCULATION BRIEF

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

100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations, 0100F-CA-V0392, Rev. 2, Washington Closure Hanford, Richland, Washington.

100-F-55/100-F-62 Waste Sites Direct Contact Hazard Quotient and Carcinogenic Risk Calculation, 0100F-CA-V0399, 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-F Field Remediation **Job No. 14655**

Area: 100-F

Discipline: Environmental *Calculation No: 0100F-CA-V0392

Subject: 100-F-55/100-F-62 Waste Site Verification 95% UCL 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 Sheets = 25 Attm. 1 = 36 Total = 62	N. Kobayashi	J. D. Skoglie	I. B. Berezovskiy	S.W. Collison	9/29/11
1	Cover = 1 Sheets = 25 Attm. 1 = 36 Total = 62	N. Kobayashi	J.D. Skoglie	NA	S.W. Collison	10/6/11
2	Cover = 1 Sheets = 25 Attm. 1 = 36 Total = 62	N. Kobayashi	J. D. Skoglie	NA	S.W. Collison	10/11/11

SUMMARY OF REVISION

1	Attachment 1, Sheet 9 and 10; revised sample result for NX-4 resample 1 (J1KNK0). Sheet 21 and 22; corrected type to show the correct HEIS number for SPA-7 resample 3.
2	Sheet 4; revised summary result to show the correct result for dieldrin .

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

Washington Closure Hanford **CALCULATION SHEET**

Originator	N. Kobayashi nK.	**Date**	09/29/11	**Calc. No.**	0100F-CA-V0392	**Rev. No.**	0
Project	100-F Field Remediation	**Job No.**	14655	**Checked**	J. D. Skoglie	**Date**	09/29/11
Subject	100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations					**Sheet No.**	1 of 25

Summary

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

Table of Contents:
Sheets 1 to 5 - Calculation Sheet Summary
Sheets 6 to 13 - Calculation Sheet Verification Data
Sheets 14 to 19 - Ecology Software (MTCAStat) Results
Sheets 20 to 25 - Calculation Sheet - Duplicate Analysis
Attachment 1 - 100-F-55/100-F-62, Verification Sampling Results (36 pages)

Given/References:
1) Sample Results (Attachment 1).
2) Background values and remedial action goals (RAGs) are taken from DOE-RL (2009b), DOE-RL (2001), and Ecology (1994). Remedial action goals (RAGs) are taken from DOE-RL (2009b) 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.
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12) WAC 173-340, 1996, "Model Toxic Control Act - Cleanup," *Washington Administrative Code.*

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

Calculation Description:
The subject calculations were performed on statistical data from soil verification samples (Attachment 1) from the 100-F-55/100-F-62 waste site. The data were entered into an EXCEL 2003 spreadsheet and calculations performed by using the built-in spreadsheet functions and/or creating formulae within the cells. The statistical evaluation of data for use in accordance with the RDR/RAWP (DOE-RL 2009b) is documented by this calculation. Duplicate RPD results are used in evaluation of data quality within the RSVP for this site.

Methodology:
The 100-F-55/100-F-62 waste site underwent statistical and composite samplings. The 100-F-55/100-F-62 waste site was divided into three decision units: north excavation, south excavation, and staging pile areas. The twelve statistical samples were collected from each of the north and south excavations. Fourteen composite samples and one focus sample were collected from the staging pile area. The 100-F-55/100-F-62 waste site was resampled due to RAG exceedance and further excavation.

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 assessment section of the associated RSVP.

Washington Closure Hanford **CALCULATION SHEET**

Originator N. Kobayashi N.K.	**Date** 09/29/11	**Calc. No.** 0100F-CA-V0392	**Rev. No.** 0
Project 100-F Field Remediation	**Job No.** 14655	**Checked** J. D. Skoglie	**Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 2 of 25

Summary (continued)

Methodology, continued:

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

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

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

The WAC 173-340-740(7)(e) 3-part test is not performed for COPCs where the statistical value defaults to the maximum value in the data set. Instead, direct comparison of the maximum value against site remedial action goals (RAGs) (within the RSVP) is used as the compliance basis.

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

The RPD is calculated when both the primary value and the duplicate value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method and is listed in Table II-1 of the SAP (DOE-RL 2009a). Where direct evaluation of the attached sample data showed that a given analyte was not detected in the primary and/or duplicate sample, further evaluation of the RPD value was not performed. The RPD calculations use the following formula:

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

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

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

Washington Closure Hanford **CALCULATION SHEET**

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 3 of 25

Results:
The results presented in the tables that follow include the summary of the results of the 95% UCL calculations for the excavation and stockpile areas, 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 North Excavation

Analyte	95% UCL Result	Maximum Result	Units
Arsenic	3.3	–	mg/kg
Barium	104	–	mg/kg
Beryllium	0.29	–	mg/kg
Boron	2.3	–	mg/kg
Cadmium	0.14	–	mg/kg
Chromium	12.4	–	mg/kg
Cobalt	6.9	–	mg/kg
Copper	17.0	–	mg/kg
Lead	36.0	–	mg/kg
Manganese	326	–	mg/kg
Mercury	0.027	–	mg/kg
Molybdenum	–	0.26	mg/kg
Nickel	12.0	–	mg/kg
Vanadium	42.8	–	mg/kg
Zinc	53.9	–	mg/kg
SVOA- Bis(2-ethylhexyl)phthalate	211	–	ug/kg
SVOA- Di-n-butylphthalate	–	120	ug/kg
SVOA- Phenol	–	25	ug/kg
alpha-Chlordane	30	–	ug/kg
4,4'-DDE	–	6.9	ug/kg
4,4'-DDT	–	7.4	ug/kg
Dieldrin	37	–	ug/kg
gamma-Chlordane	16	–	ug/kg
Aroclor-1260	46	–	ug/kg
PAH- Acenaphthene	–	16	ug/kg
PAH- Acenaphthylene	–	27	ug/kg
PAH- Anthracene	–	15	ug/kg
PAH- Benzo(a)anthracene	172	–	ug/kg
PAH- Benzo(a)pyrene	127	–	ug/kg
PAH- Benzo(b)fluoranthene	149	–	ug/kg
PAH- Benzo(ghi)perylene	–	48	ug/kg
PAH- Benzo(k)fluoranthene	31	–	ug/kg
PAH- Chrysene	161	–	ug/kg
PAH- Dibenz(a,h)anthracene	–	18	ug/kg
PAH- Fluoranthene	192	–	ug/kg
PAH- Fluorene	–	17	ug/kg
PAH- Indeno(1,2,3-cd)pyrene	–	63	ug/kg
PAH- Phenanthrene	62	–	ug/kg
PAH- Pyrene	182	–	ug/kg

WAC 173-340-740(7)(e) Evaluation:
WAC 173-340 3-Part Test for most stringent RAG:

95% UCL > Cleanup Limit?	YES
> 10% above Cleanup Limit?	YES
Any sample > 2x Cleanup Limit?	YES

Results Summary South Excavation

Analyte	95% UCL Result	Maximum Result	Units
Cesium-137	0.0230	–	pCi/g
Arsenic	3.0	–	mg/kg
Barium	87.8	–	mg/kg
Beryllium	0.14	–	mg/kg
Boron	4.1	–	mg/kg
Cadmium	0.097		mg/kg
Chromium	11.6	–	mg/kg
Cobalt	6.4	–	mg/kg
Copper	13.4	–	mg/kg
Lead	5.7	–	mg/kg
Manganese	257	–	mg/kg
Mercury[b]	6.8	–	mg/kg
Molybdenum	–	0.25	mg/kg
Nickel	12.6	–	mg/kg
Vanadium	39.2	–	mg/kg
Zinc	48.7	–	mg/kg
SVOA- Phenol	–	35	ug/kg
Aroclor-1248	–	240	ug/kg
Aroclor-1254	–	24	ug/kg
Aroclor-1260	–	8.5	ug/kg
PAH- Anthracene	12	–	ug/kg
PAH- Benzo(a)anthracene	71	–	ug/kg
PAH- Benzo(a)pyrene[b]	82	–	ug/kg
PAH- Benzo(b)fluoranthene	196	–	ug/kg
PAH- Benzo(ghi)perylene	–	39	ug/kg
PAH- Benzo(k)fluoranthene	87	–	ug/kg
PAH- Chrysene	440	–	ug/kg
PAH- Dibenz(a,h)anthracene	–	23	ug/kg
PAH- Fluoranthene	492	–	ug/kg
PAH- Fluorene	–	16	ug/kg
PAH- Indeno(1,2,3-cd)pyrene	–	52	ug/kg
PAH- Phenanthrene	43	–	ug/kg
PAH- Pyrene	709	–	ug/kg

WAC 173-340-740(7)(e) Evaluation:
WAC 173-340 3-Part Test for most stringent RAG:

95% UCL > Cleanup Limit?	YES
> 10% above Cleanup Limit?	YES
Any sample > 2x Cleanup Limit?	YES

[a]The 95% UCL result or maximum value, depending on data censorship, as described in the methodology section.
[b]The 95% UCL result was determined using ProUCL 4.0 (EPA 2007) software instead of MTCA Stat software (WCH 2010).
-- = not applicable
B = blank contamination (inorganic constituents)
DE = direct exposure
GW = groundwater
J = estimate
M = sample duplicate precision not met
MTCA = *Model Toxics Control Act*
PQL = practical quantitation limit

Q = qualifier
QA/QC = quality assurance/quality control
RAG = remedial action goal
RDR/RAWP = remedial design report/remedial action work plan
RESRAD = RESidual RADioactivity (dose model)
RPD = relative percent difference
RSVP = remaining sites verification package
SAP = sampling and analysis plan
TDL = target detection limit
U = undetected
UCL = upper confidence limit
WAC = Washington Administrative Code

Washington Closure Hanford **CALCULATION SHEET**

Originator	N. Kobayashi n.k.	**Date**	10/10/11	**Calc. No.**	0100F-CA-V0392	**Rev. No.**	2
Project	100-F Field Remediation	**Job No.**	14655	**Checked**	J. D. Skoglie	**Date**	10/10/11
Subject	100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations					**Sheet No.**	4 of 25

Results:
The results presented in the tables that follow include the summary of the results of the 95% UCL calculations for the excavation and stockpile areas, 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.

Summary (Continued)

Results Summary Stockpile

Analyte	Maximum	Units
Cesium-137	0.137	pCi/g
Arsenic	3.9	mg/kg
Barium	157	mg/kg
Beryllium	0.33	mg/kg
Boron	8.3	mg/kg
Cadmium	0.27	mg/kg
Chromium	16.9	mg/kg
Cobalt	7.3	mg/kg
Copper	18.2	mg/kg
Hexavalent Chromium	0.749	mg/kg
Lead	19.5	mg/kg
Manganese	340	mg/kg
Mercury	0.69	mg/kg
Molybdenum	0.39	mg/kg
Nickel	15.0	mg/kg
Silver	0.97	mg/kg
Vanadium	42.6	mg/kg
Zinc	74.8	mg/kg
SVOA- Bis(2-ethylhexyl)phthalate	69	ug/kg
SVOA- Di-n-octylphthalate	68	ug/kg
SVOA- Phenol	80	ug/kg
alpha-Chlordane	0.81	ug/kg
Dieldrin	3.0	ug/kg
gamma-Chlordane	0.91	ug/kg
Aroclor-1248	25	ug/kg
Aroclor-1254	19	ug/kg
Aroclor-1260	22	ug/kg
PAH- Anthracene	26	ug/kg
PAH- Benzo(a)anthracene	110	ug/kg
PAH- Benzo(a)pyrene	86	ug/kg
PAH- Benzo(b)fluoranthene	62	ug/kg
PAH- Benzo(ghi)perylene	27	ug/kg
PAH- Benzo(k)fluoranthene	43	ug/kg
PAH- Chrysene	100	ug/kg
PAH- Fluoranthene	200	ug/kg
PAH- Fluorene	16	ug/kg
PAH- Indeno(1,2,3-cd)pyrene	49	ug/kg
PAH- Phenanthrene	93	ug/kg
PAH- Pyrene	160	ug/kg

Washington Closure Hanford **CALCULATION SHEET**

Originator	N. Kobayashi n.k.	**Calc. No.**	0100F-CA-V0392	**Rev. No.**	0
Project	100-F Field Remediation	**Checked**	J. D. Skoglie	**Date**	09/29/11
Subject	100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.**	5 of 25

Summary (continued)

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

Analyte	Duplicate Analysis North Excavation	Duplicate Analysis South Excavation Initial	Duplicate Analysis East Stockpile	Duplicate Analysis North Stockpile
Aluminum	0.6%	0.8%	2.2%	12.4%
Barium	2.9%	3.2%	61.5%	12.3%
Calcium	0.8%	8.0%	7.7%	4.3%
Chromium		8.3%	13.6%	19.5%
Copper	4.9%	1.7%	11.0%	3.5%
Iron	3.9%	1.4%	9.6%	9.9%
Magnesium	0.5%	4.7%	3.2%	10.8%
Manganese	4.9%		4.6%	6.7%
Mercury		18.2%		
Silicon	0.9%	16.7%	28.1%	27.5%
Vanadium	3.1%	2.8%	10.9%	2.1%
Zinc	4.2%	3.2%	11.8%	9.2%
PAH- Fluoranthene			58.1%	
PAH- Pyrene			20.7%	

Grey cells indicate not applicable

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

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k.	**Date** 09/29/11	**Calc. No.** 0100F-CA-V0392	**Rev. No.** 0
Project 100-F Field Remediation	**Job No.** 14655	**Checked** J. D. Skoglie	**Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 6 of 25

100-F-55/100-F-62 Statistical Calculations-North Excavation

Verification Data

1	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead		
2	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
3	NX-9	J1K3P0	6/29/2011	3.0		0.63	101		0.072	0.26		0.031	1.9		0.93	0.12	B	0.039	11.3		0.055	6.5	X	0.095	13.8		0.21	7.5		0.26
4	Duplicate of J1K3P0	J1K3P4	6/29/2011	3.1		0.61	104		0.071	0.26		0.031	2.4		0.91	0.14	B	0.038	11.3		0.054	6.5	X	0.093	14.5		0.20	7.6		0.25
5	NX-1	J1K3N2	6/29/2011	3.0		0.59	92.9		0.068	0.28		0.030	1.8		0.88	0.17	B	0.037	11.8		0.052	6.2	X	0.090	16.6		0.20	7.8		0.24
6	NX-2	J1K3N3	6/29/2011	2.9		0.60	93.3		0.069	0.27		0.030	1.8		0.89	0.11	B	0.037	11.3		0.053	6.8	X	0.091	15.6		0.20	6.8		0.25
7	NX-3	J1K3N4	6/29/2011	3.0		0.66	82.4		0.076	0.28		0.033	1.1	B	0.98	0.078	B	0.041	11.2		0.058	7.0	X	0.10	14.0		0.22	9.0		0.27
8	NX-4	J1K3N5	6/29/2011	3.0		0.61	110		0.070	0.30		0.030	2.2		0.90	0.16	B	0.038	13.0		0.053	6.8	X	0.092	17.1		0.20	136		0.25
9	NX-5	J1K3N6	6/29/2011	3.1		0.65	107		0.075	0.29		0.033	2.9		0.97	0.089	B	0.040	11.7		0.057	6.7	X	0.099	18.3		0.21	6.4		0.27
10	NX-6	J1K3N7	6/29/2011	2.6		0.64	101		0.074	0.22		0.032	2.5		0.95	0.11	B	0.040	9.6		0.056	5.7	X	0.097	13.9		0.21	7.2		0.26
11	NX-7	J1K3N8	6/29/2011	4.3		0.66	115		0.076	0.29		0.033	2.4		0.98	0.16	B	0.041	13.8		0.058	6.9	X	0.10	18.5		0.22	12.6		0.27
12	NX-8	J1K3N9	6/29/2011	2.8		0.65	89.0		0.075	0.29		0.033	1.1	B	0.97	0.084	B	0.040	12.0		0.057	7.2	X	0.099	15.8		0.21	6.8		0.27
13	NX-10	J1K3P1	6/29/2011	3.1		0.63	103		0.072	0.25		0.031	1.8	B	0.93	0.11	B	0.039	11.4		0.055	6.6	X	0.095	19.0		0.21	9.5		0.26
14	NX-11	J1K3P2	6/29/2011	3.2		0.66	100		0.076	0.30		0.033	1.1	B	0.98	0.097	B	0.041	11.6		0.058	7.4	X	0.10	13.7		0.22	5.6		0.27
15	NX-12	J1K3P3	6/29/2011	2.7		0.66	81.8		0.076	0.24		0.033	1.0	B	0.99	0.090	B	0.041	13.0		0.058	6.4	X	0.10	13.8		0.22	5.5		0.27

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead
18	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
19	NX-9	J1K3P0/J1K3P4	6/29/2011	3.1	103	0.26	2.2	0.13	11.3	6.5	14.2	7.6
20	NX-1	J1K3N2	6/29/2011	3.0	92.9	0.28	1.8	0.17	11.8	6.2	16.6	7.8
21	NX-2	J1K3N3	6/29/2011	2.9	93.3	0.27	1.8	0.11	11.3	6.8	15.6	6.8
22	NX-3	J1K3N4	6/29/2011	3.0	82.4	0.28	1.1	0.078	11.2	7.0	14.0	9.0
23	NX-4	J1K3N5	6/29/2011	3.0	110	0.30	2.2	0.16	13.0	6.8	17.1	136
24	NX-5	J1K3N6	6/29/2011	3.1	107	0.29	2.9	0.089	11.7	6.7	18.3	6.4
25	NX-6	J1K3N7	6/29/2011	2.6	101	0.22	2.5	0.11	9.6	5.7	13.9	7.2
26	NX-7	J1K3N8	6/29/2011	4.3	115	0.29	2.4	0.16	13.8	6.9	18.5	12.6
27	NX-8	J1K3N9	6/29/2011	2.8	89.0	0.29	1.1	0.084	12.0	7.2	15.8	6.8
28	NX-10	J1K3P1	6/29/2011	3.1	103	0.25	1.8	0.11	11.4	6.6	19.0	9.5
29	NX-11	J1K3P2	6/29/2011	3.2	100	0.30	1.1	0.10	11.6	7.4	13.7	5.6
30	NX-12	J1K3P3	6/29/2011	2.7	81.8	0.24	1.0	0.090	13.0	6.4	13.8	5.5

31 **Statistical Computations**

32		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead
33	95% UCL based on	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat 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), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.
34	N	12	12	12	12	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	0%	0%	0%	0%	0%	0%
36	Mean	3.1	98.2	0.27	1.8	0.12	11.8	6.7	15.9	18.4
37	Standard deviation	0.43	10.5	0.025	0.64	0.032	1.1	0.45	2.0	37.1
38	95% UCL on mean	3.3	104	0.29	2.3	0.14	12.4	6.9	17.0	36.0
39	Maximum value	4.3	115	0.30	2.9	0.17	13.8	7.4	19.0	136
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	20 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	320 GW Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection	22.0 River Protection	10.2 GW & River Protection
41	**WAC 173-340 3-PART TEST**									
42	95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	YES
43	> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	YES
44	Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	YES
45	**WAC 173-340 Compliance?**	Because all values are below background (6.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (132 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (1.51 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (0.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (18.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (15.7 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (22.0 mg/kg) the WAC 173-340 3-part test is not required.	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. | Date 09/29/11 | Calc. No. 0100F-CA-V0392 | Rev. No. 0
Project 100-F Field Remediation | Job No. 14655 | Checked J. D. Skoglie | Date 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations | Sheet No. 7 of 25

100-F-55/100-F-62 Statistical Calculations-North Excavation

Verification Data

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Q	PQL	Mercury mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL
NX-9	J1K3P0	6/29/2011	312		0.095	0.020		0.0051	11.5	X	0.12	42.5		0.089	52.9		0.38
Duplicate of J1K3P0	J1K3P4	6/29/2011	297		0.093	0.024		0.0050	11.1	X	0.11	41.2		0.088	50.7		0.37
NX-1	J1K3N2	6/29/2011	298		0.090	0.026	M	0.0054	11.4	X	0.11	38.3		0.085	49.9		0.36
NX-2	J1K3N3	6/29/2011	316		0.091	0.019		0.0050	11.3	X	0.11	42.6		0.085	45.7		0.36
NX-3	J1K3N4	6/29/2011	337		0.10	0.011	B	0.0055	11.0	X	0.12	43.7		0.094	39.3		0.40
NX-4	J1K3N5	6/29/2011	318		0.092	0.039		0.0053	12.6	X	0.11	42.1		0.086	52.9		0.37
NX-5	J1K3N6	6/29/2011	297		0.099	0.017		0.0050	11.4	X	0.12	41.3		0.093	41.6		0.39
NX-6	J1K3N7	6/29/2011	255		0.097	0.022		0.0049	11.1	X	0.12	35.2		0.091	47.2		0.38
NX-7	J1K3N8	6/29/2011	319		0.10	0.026		0.0051	13.3	X	0.12	40.9		0.094	64.7		0.40
NX-8	J1K3N9	6/29/2011	328		0.099	0.012	B	0.0050	11.9	X	0.12	45.3		0.093	43.7		0.39
NX-10	J1K3P1	6/29/2011	300		0.095	0.021		0.0056	12.1	X	0.12	42.3		0.089	64.0		0.38
NX-11	J1K3P2	6/29/2011	360		0.10	0.0095	B	0.0049	11.1	X	0.12	43.3		0.094	49.6		0.40
NX-12	J1K3P3	6/29/2011	303		0.10	0.024		0.0051	11.0	X	0.12	40.4		0.094	41.6		0.40

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Mercury mg/kg	Nickel mg/kg	Vanadium mg/kg	Zinc mg/kg
NX-9	J1K3P0/J1K3P4	6/29/2011	305	0.022	11.3	41.9	51.8
NX-1	J1K3N2	6/29/2011	298	0.026	11.4	38.3	49.9
NX-2	J1K3N3	6/29/2011	316	0.019	11.3	42.6	45.7
NX-3	J1K3N4	6/29/2011	337	0.011	11.0	43.7	39.3
NX-4	J1K3N5	6/29/2011	318	0.039	12.6	42.1	52.9
NX-5	J1K3N6	6/29/2011	297	0.017	11.4	41.3	41.6
NX-6	J1K3N7	6/29/2011	255	0.022	11.1	35.2	47.2
NX-7	J1K3N8	6/29/2011	319	0.026	13.3	40.9	64.7
NX-8	J1K3N9	6/29/2011	328	0.012	11.9	45.3	43.7
NX-10	J1K3P1	6/29/2011	300	0.021	12.1	42.3	64.0
NX-11	J1K3P2	6/29/2011	360	0.010	11.1	43.3	49.6
NX-12	J1K3P3	6/29/2011	303	0.024	11.0	40.4	41.6

Statistical Computations

	Manganese	Mercury	Nickel	Vanadium	Zinc
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 normal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
N	12	12	12	12	12
% < Detection limit	0%	0%	0%	0%	0%
Mean	311	0.021	11.6	41.4	49.3
Standard deviation	26	0.0081	0.72	2.6	8.2
95% UCL on mean	326	0.027	12.0	42.8	53.9
Maximum value	360	0.039	13.3	45.3	64.7
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted	512 GW Protection	0.33 GW & River Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection
WAC 173-340 3-PART TEST 95% UCL > Cleanup Limit?	NA	NA	NA	NA	NA
> 10% above Cleanup Limit?	NA	NA	NA	NA	NA
Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NA
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 (0.33 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1 mg/kg) the WAC 173-340 3-part test is not required.	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.

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
Sheet No. 8 of 25

100-F-55/100-F-62 Statistical Calculations-North Excavation Verification Data

	Sample Area	Sample Number	Sample Date	SVOA- Bis(2-ethylhexyl)phthalate ug/kg	Q	PQL	alpha-Chlordane ug/kg	Q	PQL	Dieldrin ug/kg	Q	PQL	gamma-Chlordane ug/kg	Q	PQL	Aroclor-1260 ug/kg	Q	PQL	PAH- Benzo(a)anthracene ug/kg	Q	PQL	PAH- Benzo(a)pyrene ug/kg	Q	PQL	PAH- Benzo(b)fluoranthene ug/kg	Q	PQL	PAH- Benzo(k)fluoranthene ug/kg	Q	PQL
3	NX-9	J1K3P0	6/29/2011	90	JB	44	3.0	UD	3.0	3.4	JXD	2.0	3.6	JD	2.5	16	P	2.4	7.7	J	3.0	12	J	6.1	13	JX	4.0	5.2	J	3.7
4	Duplicate of J1K3P0	J1K3P4	6/29/2011	79	JB	46	2.8		0.31	7.9		0.20	1.7		0.25	20	P	2.5	15		3.0	20		6.1	35	X	4.0	8.3	J	3.7
5	NX-1	J1K3N2	6/29/2011	68	JB	43	7.3	JD	3.3	32	D	2.1	5.4	JD	2.7	27	P	2.6	45	X	3.2	44		6.3	37	X	4.2	17		3.9
6	NX-2	J1K3N3	6/29/2011	91	JB	45	3.1	UD	3.1	11	JD	2.0	2.6	UD	2.6	17	P	2.6	3.1	U	3.1	13	J	6.2	12	JX	4.1	5.1	JX	3.8
7	NX-3	J1K3N4	6/29/2011	71	JB	44	3.2	UD	3.2	2.1	UD	2.1	2.6	UD	2.6	2.6	U	2.6	110		3.0	95		6.0	92		4.0	56		3.7
8	NX-4 resample 1[a]	J1KNK0	8/9/2011	48	U	48	0.32	U	0.32	3.1		0.21	0.26	U	0.26	2.8	U	2.8	3.2	U	3.2	6.5	U	6.5	4.2	U	4.2	4.0	U	4.0
9	NX-5 resample 1[a]	J1KNK1	8/9/2011	82	JB	47	1.4	J	0.33	1.5	J	0.22	1.1	J	0.27	3.1	J	2.7	3.3	U	3.3	6.6	U	6.6	4.3	U	4.3	4.1	U	4.1
10	NX-6	J1K3N7	6/29/2011	87	JB	43	4.9	JD	3.2	6.4	JD	2.1	6.0	JD	2.7	12	P	2.5	53		3.2	67		6.4	67		4.2	24		3.9
11	NX-7	J1K3N8	6/29/2011	83	JB	46	28	D	3.2	2.2	JXD	2.1	22	D	2.7	29	P	2.5	12	J	3.2	15		6.4	4.2	U	4.2	3.9	U	3.9
12	NX-8	J1K3N9	6/29/2011	71	JB	44	4.5	JD	3.1	2.0	UD	2.0	3.3	JD	2.5	8.7	J	2.6	8.2	J	3.1	8.2	J	6.2	14	JX	4.1	5.2	J	3.8
13	NX-10 resample 1[a]	J1KNK2	8/9/2011	690	JBD	470	3.3	UD	3.30	2.1	UD	2.1	2.7	UD	2.7	2.7	U	2.7	3.0	U	3.0	120		6.1	4.0	U	4.0	3.8	U	3.8
14	NX-11	J1K3P2	6/29/2011	77	JB	45	3.2	UD	3.2	2.1	UD	2.1	2.6	UD	2.6	5.2	J	2.6	22	X	3.0	22		6.1	20	X	4.0	8.4	J	3.7
15	NX-12	J1K3P3	6/29/2011	81	JB	46	0.30	U	0.30	0.19	U	0.19	0.71	J	0.24	2.4	U	2.4	4.0	JX	3.1	16		6.2	19		4.1	7.1	J	3.8

16 **Statistical Computation Input Data**

17 / 18	Sample Area	Sample Number	Sample Date	SVOA- Bis(2-ethylhexyl)phthalate ug/kg	alpha-Chlordane ug/kg	Dieldrin ug/kg	gamma-Chlordane ug/kg	Aroclor-1260 ug/kg	PAH- Benzo(a)anthracene ug/kg	PAH- Benzo(a)pyrene ug/kg	PAH- Benzo(b)fluoranthene ug/kg	PAH- Benzo(k)fluoranthene ug/kg
19	NX-9	J1K3P0/J1K3P4	6/29/2011	85	2.2	5.7	2.7	18	11	16	24	6.8
20	NX-1	J1K3N2	6/29/2011	68	7.3	32	5.4	27	45	44	37	17
21	NX-2	J1K3N3	6/29/2011	91	1.6	11	1.3	17	1.6	13	12	5.1
22	NX-3	J1K3N4	6/29/2011	71	1.6	1.1	1.3	1.3	110	95	92	56
23	NX-4 resample 1[a]	J1KNK0	8/9/2011	24	0.16	3.1	0.13	1.4	1.6	3.3	2.1	2.0
24	NX-5 resample 1[a]	J1KNK1	8/9/2011	82	1.4	1.5	1.1	3.1	1.7	3.3	2.2	2.1
25	NX-6	J1K3N7	6/29/2011	87	4.9	6.4	6.0	12	53	67	67	24
26	NX-7	J1K3N8	6/29/2011	83	28	2.2	22	29	12	15	2.1	2.0
27	NX-8	J1K3N9	6/29/2011	71	4.5	1.0	3.3	8.7	8.2	8.2	14	5.2
28	NX-10 resample 1[a]	J1KNK2	8/9/2011	690	1.7	1.1	1.4	1.4	1.5	120	2.0	1.9
29	NX-11	J1K3P2	6/29/2011	77	1.6	1.1	1.3	5.2	22	22	20	8.4
30	NX-12	J1K3P3	6/29/2011	81	0.15	0.10	0.71	1.2	4.0	16	19	7.1

31 **Statistical Computations**

32		SVOA- Bis(2-ethylhexyl)phthalate	alpha-Chlordane	Dieldrin	gamma-Chlordane	Aroclor-1260	PAH- Benzo(a)anthracene	PAH- Benzo(a)pyrene	PAH- Benzo(b)fluoranthene	PAH- Benzo(k)fluoranthene
33	95% UCL based on	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
34	N	12	12	12	12	12	12	12	12	12
35	% < Detection limit	8%	50%	42%	42%	33%	33%	17%	33%	33%
36	Mean	126	4.6	5.5	3.9	10	23	35	24	11
37	Standard deviation	179	7.7	8.9	6.0	10	33	39	28	16
38	95% UCL on mean	211	30	37	16	46	172	127	149	31
39	Maximum value	690	28	32	22	29	110	120	92	56
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (ug/kg) unless otherwise noted**	360 River Protection	16.5 River Protection	3.3 GW & River Protection	16.5 River Protection	17 GW & River Protection	15 GW & River Protection	15 GW & River Protection	15 GW & River Protection	15 GW & River Protection
41	**WAC 173-340 3-PART TEST**									
42	95% UCL > Cleanup Limit?	NO	YES	YES	NO	YES	YES	YES	YES	YES
43	> 10% above Cleanup Limit?	NO	NO	YES	NO	YES	YES	YES	YES	YES
44	Any sample > 2X Cleanup Limit?	NO	NO	YES	NO	NO	YES	YES	YES	YES
45	**WAC 173-340 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 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.	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.

[a] Due to RAG exceedances and further excavation, re-samples were taken.

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 9 of 25

100-F-55/100-F-62 Statistical Calculations-North Excavation Verification Data

	Sample Area	Sample Number	Sample Date	PAH- Chrysene ug/kg	Q	PQL	PAH- Fluoranthene ug/kg	Q	PQL	PAH- Phenanthrene ug/kg	Q	PQL	PAH- Pyrene ug/kg	Q	PQL
3	NX-9	J1K3P0	6/29/2011	13	J	4.6	15	J	12	11	U	11	19	J	11
4	Duplicate of J1K3P0	J1K3P4	6/29/2011	25	J	4.6	18	JX	12	11	U	11	16	J	11
5	NX-1	J1K3N2	6/29/2011	51		4.8	95		13	65		12	76	X	12
6	NX-2	J1K3N3	6/29/2011	17	J	4.7	23	J	13	12	U	12	17	JX	12
7	NX-3	J1K3N4	6/29/2011	97		4.6	260		12	170		11	230		11
8	NX-4 resample 1[a]	J1KNK0	8/9/2011	4.9	U	4.9	13	U	13	12	U	12	12	U	12
9	NX-5 resample 1[a]	J1KNK1	8/9/2011	5.0	U	5.0	13	U	13	12	U	12	12	U	12
10	NX-6	J1K3N7	6/29/2011	75		4.8	120		13	100		12	140		12
11	NX-7	J1K3N8	6/29/2011	4.8	U	4.8	18	J	13	12	J	12	16	JX	12
12	NX-8	J1K3N9	6/29/2011	19	J	4.7	18	J	13	12	U	12	16	JX	12
13	NX-10 resample 1[a]	J1KNK0	8/9/2011	4.6	U	4.6	36	J	12	19	JX	11	19	J	11
14	NX-11	J1K3P2	6/29/2011	29	J	4.6	52		12	46		11	59		11
15	NX-12	J1K3P3	6/29/2011	9.1	JX	4.7	13	U	13	12	U	12	12	U	12

16 **Statistical Computation Input Data**

17 / 18	Sample Area	Sample Number	Sample Date	PAH- Chrysene ug/kg	PAH- Fluoranthene ug/kg	PAH- Phenanthrene ug/kg	PAH- Pyrene ug/kg
19	NX-9	J1K3P0/J1K3P4	6/29/2011	19	17	5.5	18
20	NX-1	J1K3N2	6/29/2011	51	95	65	76
21	NX-2	J1K3N3	6/29/2011	17	23	6.0	17
22	NX-3	J1K3N4	6/29/2011	97	260	170	230
23	NX-4 resample 1[a]	J1KNK0	8/9/2011	2.5	6.5	6.0	6.0
24	NX-5 resample 1[a]	J1KNK1	8/9/2011	2.5	6.5	6.0	6.0
25	NX-6	J1K3N7	6/29/2011	75	120	100	140
26	NX-7	J1K3N8	6/29/2011	2.4	18	12	16
27	NX-8	J1K3N9	6/29/2011	19	18	6.0	16
28	NX-10 resample 1[a]	J1KNK0	8/9/2011	2.3	36	19	19
29	NX-11	J1K3P2	6/29/2011	29	52	46	59
30	NX-12	J1K3P3	6/29/2011	9.1	6.5	6.0	6.0

31 **Statistical Computations**

32		PAH- Chrysene	PAH- Fluoranthene	PAH- Phenanthrene	PAH- Pyrene
33	95% UCL based on	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.
34	N	12	12	12	12
35	% < Detection limit	33%	25%	50%	25%
36	Mean	27	55	37	51
37	Standard deviation	31	74	52	69
38	95% UCL on mean	161	192	62	182
39	Maximum value	97	260	170	230
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (ug/kg) unless otherwise noted**	100 River Protection	18000 River Protection	240000 GW Protection	48000 GW Protection
41	**WAC 173-340 3-PART TEST**				
42	95% UCL > Cleanup Limit?	YES	NO	NO	NO
43	> 10% above Cleanup Limit?	NO	NO	NO	NO
44	Any sample > 2X Cleanup Limit?	NO	NO	NO	NO
45	**WAC 173-340 Compliance?**	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

Washington Closure Hanford

Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
Sheet No. 10 of 25

1 **100-F-55/100-F-62 Statistical Calculations-South Excavation**

2 **Verification Data**

3	Sample	Sample	Sample	Cesium-137		
4	Area	Number	Date	pCi/g	Q	MDA
5	SX-12	J1K3V4	7/5/2011	0.00699	U	0.0248
6	Duplicate of J1K3V4	J1K3V5	7/5/2011	0.00521	U	0.0328
7	SX-1	J1K3T3	7/5/2011	0.0140	U	0.0343
8	SX-2	J1K3T4	7/5/2011	0.0509		0.0243
9	SX-3	J1K3T5	7/5/2011	0.0338	U	0.0356
10	SX-4	J1K3T6	7/5/2011	0.0156	U	0.0316
11	SX-5	J1K3T7	7/5/2011	0.0191	U	0.0382
12	SX-6	J1K3T8	7/5/2011	0.00609	U	0.0246
13	SX-7	J1K3T9	7/5/2011	0.0138	U	0.0349
17	SX-8	J1K3V0	7/5/2011	-0.0120	U	0.0292
15	SX-9	J1K3V1	7/5/2011	0.0265	U	0.0367
16	SX-10	J1K3V2	7/5/2011	0.0102	U	0.0288
14	SX-11	J1K3V3	7/5/2011	-0.00233	U	0.0395

18

19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Strontium-90		
21	Area	Number	Date	pCi/g		
22	SX-12	J1K3V4/J1K3V5	7/5/2011	0.00610		
23	SX-1	J1K3T3	7/5/2011	0.0140		
24	SX-2	J1K3T4	7/5/2011	0.0509		
25	SX-3	J1K3T5	7/5/2011	0.0338		
26	SX-4	J1K3T6	7/5/2011	0.0156		
27	SX-5	J1K3T7	7/5/2011	0.0191		
28	SX-6	J1K3T8	7/5/2011	0.00609		
29	SX-7	J1K3T9	7/5/2011	0.0138		
33	SX-8	J1K3V0	7/5/2011	-0.0120		
31	SX-9	J1K3V1	7/5/2011	0.0265		
32	SX-10	J1K3V2	7/5/2011	0.0102		
30	SX-11	J1K3V3	7/5/2011	-0.00233		

34 **Statistical Computations**

35		Strontium-90
36	95% UCL based on	Radionuclide data set. Use nonparametric z-statistic.
37	N	12
38	% < Detection limit	92%
39	Mean	0.0151
40	Standard deviation	0.0165
41	Z-statistic	1.64
42	95% UCL on mean	0.0230
43	Maximum value	0.0509

* Due to RAG exceedances and further excavation, re-samples were taken.

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. Date 09/29/11 Calc. No. 0100F-CA-V0392 Rev. No. 0
Project 100-F Field Remediation Job No. 14655 Checked J. D. Skoglie Date 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations Sheet No. 11 of 25

100-F-55/100-F-62 Statistical Calculations-South Excavation Verification Data

1	Sample	Sample	Sample	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead		
2	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
3	SX-12	J1K3V4	7/5/2011	1.9		0.59	76.1		0.068	0.12		0.031	3.0		0.87	0.049	B	0.037	10.0		0.052	6.0	X	0.089	11.9		0.19	4.6		0.24
4	Duplicate of J1K3V4	J1K3V5	7/5/2011	2.1		0.62	73.7		0.072	0.12	B	0.031	2.7		0.92	0.077	B	0.039	9.2		0.055	5.9	X	0.094	11.7		0.20	4.8		0.25
5	SX-1	J1K3T3	7/5/2011	2.4		0.60	50.3		0.069	0.097	B	0.030	1.9		0.88	0.059	B	0.037	10.2		0.052	6.0	X	0.090	12.4		0.20	4.2		0.24
6	SX-2	J1K3T4	7/5/2011	2.7		0.62	80.6		0.072	0.13	B	0.031	3.6		0.93	0.080	B	0.039	13.4		0.055	6.5	X	0.095	14.3		0.21	5.8		0.26
7	SX-3	J1K3T5	7/5/2011	2.4		0.65	58.2		0.075	0.12	B	0.032	2.2		0.96	0.078	B	0.040	10.9		0.057	6.0	X	0.098	12.5		0.21	5.9		0.26
8	SX-4	J1K3T6	7/5/2011	2.3		0.64	69.8		0.074	0.12	B	0.032	2.9		0.95	0.079	B	0.040	9.5		0.056	6.4	X	0.097	11.8		0.21	6.1		0.26
9	SX-5	J1K3T7	7/5/2011	2.3		0.58	69.2		0.067	0.15	B	0.029	3.0		0.87	0.16	B	0.036	10.1		0.051	6.4	X	0.089	13.4		0.19	5.1		0.24
10	SX-6	J1K3T8	7/5/2011	1.9		0.57	120		0.066	0.12	B	0.029	7.3		0.85	0.079	B	0.035	10.1		0.050	5.5	X	0.086	11.9		0.19	3.4		0.23
11	SX-7	J1K3T9	7/5/2011	1.9		0.56	74.1		0.064	0.12	B	0.028	3.0		0.83	0.077	B	0.035	9.2		0.049	6.3	X	0.085	12.8		0.18	4.6		0.23
12	SX-8	J1K3V0	7/5/2011	5.4		0.56	50.0		0.064	0.12	B	0.028	1.4	B	0.83	0.075	B	0.035	11.5		0.049	5.9	X	0.084	13.2		0.18	3.9		0.23
13	SX-9	J1K3V1	7/5/2011	3.1		0.65	116		0.075	0.21		0.032	6.6		0.96	0.11	B	0.040	12.7		0.057	6.8	X	0.098	14.9		0.21	6.5		0.27
14	SX-10	J1K3V2	7/5/2011	2.5		0.62	67.2		0.072	0.15	B	0.031	2.2		0.93	0.083	B	0.039	11.8		0.055	6.3	X	0.095	13.6		0.21	6.0		0.26
15	SX-11	J1K3V3	7/5/2011	1.5		0.60	41.0		0.070	0.093	B	0.030	0.90	U	0.90	0.065	B	0.038	11.1		0.053	6.5	X	0.092	11.9		0.20	2.9		0.25

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead
18	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
19	SX-12	J1K3V4/J1K3V5	7/5/2011	2.0	74.9	0.12	2.9	0.063	9.6	6.0	11.8	4.7
20	SX-1	J1K3T3	7/5/2011	2.4	50.3	0.097	1.9	0.059	10.2	6.0	12.4	4.2
21	SX-2	J1K3T4	7/5/2011	2.7	80.6	0.13	3.6	0.080	13.4	6.5	14.3	5.8
22	SX-3	J1K3T5	7/5/2011	2.4	58.2	0.12	2.2	0.078	10.9	6.0	12.5	5.9
23	SX-4	J1K3T6	7/5/2011	2.3	69.8	0.12	2.9	0.079	9.5	6.4	11.8	6.1
24	SX-5	J1K3T7	7/5/2011	2.3	69.2	0.15	3.0	0.16	10.1	6.4	13.4	5.1
25	SX-6	J1K3T8	7/5/2011	1.9	120	0.12	7.3	0.079	10.1	5.5	11.9	3.4
26	SX-7	J1K3T9	7/5/2011	1.9	74.1	0.12	3.0	0.077	9.2	6.3	12.8	4.6
27	SX-8	J1K3V0	7/5/2011	5.4	50.0	0.12	1.4	0.075	11.5	5.9	13.2	3.9
28	SX-9	J1K3V1	7/5/2011	3.1	116	0.21	6.6	0.11	12.7	6.8	14.9	6.5
29	SX-10	J1K3V2	7/5/2011	2.5	67.2	0.15	2.2	0.083	11.8	6.3	13.6	6.0
30	SX-11	J1K3V3	7/5/2011	1.5	41.0	0.093	0.45	0.065	11.1	6.5	11.9	2.9

31 **Statistical Computations**

32		Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead
33	95% UCL based on	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.	Large data set (n ≥10), use MTCAStat lognormal distribution.
34	N	12	12	12	12	12	12	12	12	12
35	% < Detection limit	0%	0%	0%	8%	0%	0%	0%	0%	0%
36	Mean	2.5	72.6	0.13	3.1	0.084	10.8	6.2	12.9	4.9
37	Standard deviation	1.0	24.2	0.031	2.0	0.027	1.3	0.35	1.0	1.2
38	95% UCL on mean	3.0	87.8	0.14	4.1	0.097	11.6	6.4	13.4	5.7
39	Maximum value	5.4	120	0.21	7.3	0.16	13.4	6.8	14.9	6.5
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)**	20 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	320 GW Protection	0.81 GW & River Protection	18.5 GW & River Protection	15.7 GW Protection	22.0 River Protection	10.2 GW & River Protection
41	**WAC 173-340 3-PART TEST**									
42	95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA
43	> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA
44	Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NA	NA
45	**WAC 173-340 Compliance?**	Because all values are below background (6.5mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (132 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (1.51 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (0.81 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (18.5 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (15.7 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (22.0 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (10.2 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi N.K
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
Sheet No. 12 of 25

100-F-55/100-F-62 Statistical Calculations-South Excavation

Verification Data

1	Sample	Sample	Sample	Manganese			Mercury			Nickel			Vanadium			Zinc		
2	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL
3	SX-12	J1K3V4	7/5/2011	233		0.089	1.8		0.027	10.5		0.11	36.8		0.084	33.7		0.35
4	Duplicate of J1K3V4	J1K3V5	7/5/2011	233		0.094	1.5		0.027	10.3		0.12	35.8		0.088	34.8		0.37
5	SX-1	J1K3T3	7/5/2011	242		0.090	0.79		0.025	11.3		0.11	39.1		0.085	34.5		0.36
6	SX-2	J1K3T4	7/5/2011	246		0.095	4.2		0.11	17.1		0.12	38.3		0.089	37.1		0.38
7	SX-3	J1K3T5	7/5/2011	240		0.098	2.4	M	0.11	10.2		0.12	39.0		0.092	37.3		0.39
8	SX-4	J1K3T6	7/5/2011	267		0.097	0.13		0.0055	10.9		0.12	39.5		0.091	36.2		0.39
9	SX-5	J1K3T7	7/5/2011	261		0.089	15.8		0.53	10.5		0.11	39.0		0.083	84.1		0.35
10	SX-6	J1K3T8	7/5/2011	244		0.086	0.18		0.0054	11.1		0.11	36.5		0.081	35.5		0.34
11	SX-7	J1K3T9	7/5/2011	251		0.085	0.15		0.0050	10.7		0.10	40.9		0.080	37.9		0.34
12	SX-8	J1K3V0	7/5/2011	257		0.084	1.1		0.024	11.6		0.10	37.7		0.079	33.2		0.34
13	SX-9	J1K3V1	7/5/2011	267		0.098	0.12		0.0055	12.8		0.12	40.3		0.093	59.3		0.39
14	SX-10	J1K3V2	7/5/2011	262		0.095	0.10		0.0050	11.0		0.12	38.3		0.089	38.3		0.38
15	SX-11	J1K3V3	7/5/2011	223		0.092	0.083		0.0050	12.6		0.11	35.9		0.086	29.9		0.36

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	Manganese			Mercury			Nickel			Vanadium			Zinc		
18	Area	Number	Date	mg/kg			mg/kg			mg/kg			mg/kg			ug/kg		
19	SX-12	J1K3V4/J1K3V5	7/5/2011	233			1.7			10.4			36.3			34.3		
20	SX-1	J1K3T3	7/5/2011	242			0.79			11.3			39.1			34.5		
21	SX-2	J1K3T4	7/5/2011	246			4.2			17.1			38.3			37.1		
22	SX-3	J1K3T5	7/5/2011	240			2.4			10.2			39.0			37.3		
23	SX-4	J1K3T6	7/5/2011	267			0.13			10.9			39.5			36.2		
24	SX-5	J1K3T7	7/5/2011	261			15.8			10.5			39.0			84.1		
25	SX-6	J1K3T8	7/5/2011	244			0.18			11.1			36.5			35.5		
26	SX-7	J1K3T9	7/5/2011	251			0.15			10.7			40.9			37.9		
27	SX-8	J1K3V0	7/5/2011	257			1.1			11.6			37.7			33.2		
28	SX-9	J1K3V1	7/5/2011	267			0.12			12.8			40.3			59.3		
29	SX-10	J1K3V2	7/5/2011	262			0.10			11.0			38.3			38.3		
30	SX-11	J1K3V3	7/5/2011	223			0.083			12.6			35.9			29.9		

31 **Statistical Computations**

32		Manganese			Mercury			Nickel			Vanadium			Zinc		
33	95% UCL based on	Large data set (n ≥10), use MTCAStat lognormal distribution.			Use ProUCL 95% Approximate Gamma UCL.			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.		
34	N	12			12			12			12			12		
35	% < Detection limit	0%			0%			0%			0%			0%		
36	Mean	249			2.2			11.7			38.4			41.5		
37	Standard deviation	14			4.5			1.9			1.6			15.3		
38	95% UCL on mean	257			6.8			12.6			39.2			48.7		
39	Maximum value	267			15.8			17.1			40.9			84.1		
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless otherwise noted**	512	GW Protection		0.33	GW & River Protection		19.1	GW Protection		85.1	GW Protection		67.8	River Protection	
41	**WAC 173-340 3-PART TEST**															
42	95% UCL > Cleanup Limit?	NA			YES			NA			NA			NO		
43	> 10% above Cleanup Limit?	NA			YES			NA			NA			NO		
44	Any sample > 2X Cleanup Limit?	NA			YES			NA			NA			NO		
45	**WAC 173-340 Compliance?**	Because all values are below background (512 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 (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.		

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

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Date 09/29/11
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100-F-55/100-F-62 Statistical Calculations-South Excavation Verification Data

1	Sample	Sample	Sample	PAH- Anthracene			PAH- Benzo(a)anthracene			PAH- Benzo(a)pyrene			PAH- Benzo(b)fluoranthene			PAH- Benzo(k)fluoranthene			PAH- Chrysene			PAH- Fluoranthene			PAH- Phenanthrene			PAH- Pyrene		
2	Area	Number	Date	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
3	SX-12 resample 1[a]	J1KNL1	8/10/2011	3.0	U	3.0	13	J	3.1	9.1	JX	6.3	7.8	J	4.1	4.9	J	3.8	13	J	4.7	25	J	13	12	J	12	30	J	12
4	Duplicate of J1KNL1 resample 1[a]	J1KNL2	8/10/2011	3.6	U	3.6	3.7	U	3.7	7.5	U	7.5	4.9	U	4.9	4.6	U	4.6	5.6	U	5.6	15	U	15	14	U	14	14	U	14
5	SX-1	J1K3T3	7/5/2011	6.4	J	3.1	56		3.2	37		6.5	31		4.2	15		4.0	42		4.9	71		13	19	J	12	83		12
6	SX-2 resample 1[a]	J1KNK5	8/10/2011	3.3	U	3.3	16		3.4	17		6.9	12	J	4.5	6.2	J	4.3	17	J	5.2	25	J	14	13	U	13	31	J	13
7	SX-3 resample 1[a]	J1KNK6	8/10/2011	2.9	U	2.9	3.1	U	3.1	6.2	U	6.2	4.1	U	4.1	3.8	U	3.8	4.7	U	4.7	13	U	13	12	U	12	12	U	12
8	SX-4	J1K3T6	7/5/2011	17	JX	2.9	110	X	3.1	96		6.2	69	X	4.0	46		3.8	100		4.7	190		13	72		12	250		12
9	SX-5	J1K3T7	7/5/2011	14	J	2.9	85		3.1	78		6.1	45		4.0	35		3.8	79		4.6	130		12	42		11	160		11
10	SX-6 resample 1[a]	J1KNK7	8/10/2011	2.8	U	2.8	3.0	U	3.0	6.0	U	6.0	3.9	U	3.9	3.7	U	3.7	4.5	U	4.5	12	U	12	11	U	11	11	U	11
11	SX-7 resample 1[a]	J1KNK8	8/10/2011	21	X	3.1	140		3.2	120		6.5	90		4.3	57		4.0	140		4.9	250		13	87		12	220	X	12
12	SX-8	J1K3V0	7/5/2011	22		3.0	94		3.1	79		6.2	53	X	4.1	35		3.8	90		4.7	160		13	63		12	190		12
13	SX-9 resample 1[a]	J1KNK9	8/10/2011	2.9	U	2.9	17		3.1	20		6.1	11	JX	4.0	8.0	J	3.8	17	J	4.6	26	J	12	11	U	11	36	J	11
14	SX-10 resample 1[a]	J1KNL0	8/10/2011	2.9	U	2.9	3.0	U	3.0	6.1	U	6.1	4.0	U	4.0	3.7	U	3.7	4.6	U	4.6	12	U	12	11	U	11	11	U	11
15	SX-11	J1K3V3	7/5/2011	8.5	J	3.0	51		3.1	33		6.3	23	X	4.1	12	J	3.9	40		4.7	73		13	30	J	12	90		12

16 **Statistical Computation Input Data**

17	Sample	Sample	Sample	PAH- Anthracene	PAH- Benzo(a)anthracene	PAH- Benzo(a)pyrene	PAH- Benzo(b)fluoranthene	PAH- Benzo(k)fluoranthene	PAH- Chrysene	PAH- Fluoranthene	PAH- Phenanthrene	PAH- Pyrene
18	Area	Number	Date	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
19	SX-12 resample 1[a]	J1KNL1/J1KNL2	8/10/2011	1.7	7.4	6.4	5.1	3.6	7.9	16	9.5	19
20	SX-1	J1K3T3	7/5/2011	6.4	56	37	31	15	42	71	19	83
21	SX-2 resample 1[a]	J1KNK5	8/10/2011	1.7	16	17	12	6.2	17	25	6.5	31
22	SX-3 resample 1[a]	J1KNK6	8/10/2011	1.5	1.6	3.1	2.1	1.9	2.4	6.5	6.0	6.0
23	SX-4	J1K3T6	7/5/2011	17	110	96	69	46	100	190	72	250
24	SX-5	J1K3T7	7/5/2011	14	85	78	45	35	79	130	42	160
25	SX-6 resample 1[a]	J1KNK7	8/10/2011	1.4	1.5	3.0	2.0	1.9	2.3	6.0	5.5	5.5
26	SX-7 resample 1[a]	J1KNK8	8/10/2011	21	140	120	90	57	140	250	87	220
27	SX-8	J1K3V0	7/5/2011	22	94	79	53	35	90	160	63	190
28	SX-9 resample 1[a]	J1KNK9	8/10/2011	1.5	17	20	11	8.0	17	26	5.5	36
29	SX-10 resample 1[a]	J1KNL0	8/10/2011	1.5	1.5	3.1	2.0	1.9	2.3	6.0	5.5	5.5
30	SX-11	J1K3V3	7/5/2011	8.5	51	33	23	12	40	73	30	90

31 **Statistical Computations**

32		PAH- Anthracene	PAH- Benzo(a)anthracene	PAH- Benzo(a)pyrene	PAH- Benzo(b)fluoranthene	PAH- Benzo(k)fluoranthene	PAH- Chrysene	PAH- Fluoranthene	PAH- Phenanthrene	PAH- Pyrene
33	95% UCL based on	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥10), lognormal and normal distribution rejected, use z-statistic.	Use ProUCL 95% Approximate Gamma UCL.	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.
34	N	12	12	12	12	12	12	12	12	12
35	% < Detection limit	50%	25%	25%	25%	25%	25%	25%	42%	25%
36	Mean	8.2	48	41	29	19	45	80	29	91
37	Standard deviation	8.2	49	41	29	19	46	83	30	91
38	95% UCL on mean	12	71	82	196	87	440	492	43	709
39	Maximum value	22	140	120	90	57	140	250	87	250
40	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (ug/kg) unless otherwise noted**	240000 GW Protection	15 GW & River Protection	15 GW & River Protection	15 GW & River Protection	15 GW & River Protection	100 River Protection	18000 River Protection	240000 GW Protection	48000 GW Protection
41	**WAC 173-340 3-PART TEST**									
42	95% UCL > Cleanup Limit?	NO	YES	YES	YES	YES	YES	NO	NO	NO
43	> 10% above Cleanup Limit?	NO	YES	YES	YES	YES	NO	NO	NO	NO
44	Any sample > 2X Cleanup Limit?	NO	YES	YES	YES	YES	NO	NO	NO	NO
45	**WAC 173-340 Compliance?**	A detailed assessment will be performed. The data set meets the 3-part test criteria when compared to the direct exposure RAG.	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.	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 N. Kobayashi N.K.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

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Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 North Excavation

Arsenic 95% UCL Calculation

DATA	ID
3.1	J1K3P0/J1K3P4
3.0	J1K3N2
2.9	J1K3N3
3.0	J1K3N4
3.0	J1K3N5
3.1	J1K3N6
2.6	J1K3N7
4.3	J1K3N8
2.8	J1K3N9
3.1	J1K3P1
3.2	J1K3P2
2.7	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	3.1
Censored		Lognormal mean	3.1
Detection limit or PQL		Std. devn.	0.43
Method detection limit		Median	3.0
TOTAL	12	Min.	2.6
		Max.	4.3

Lognormal distribution? r-squared is: 0.758
Normal distribution? r-squared is: 0.690
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 3.3

Barium 95% UCL Calculation

DATA	ID
103	J1K3P0/J1K3P4
92.9	J1K3N2
93.3	J1K3N3
82.4	J1K3N4
110	J1K3N5
107	J1K3N6
101	J1K3N7
115	J1K3N8
89.0	J1K3N9
103	J1K3P1
100	J1K3P2
81.8	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	98.2
Censored		Lognormal mean	98.2
Detection limit or PQL		Std. devn.	10.5
Method detection limit		Median	101
TOTAL	12	Min.	81.8
		Max.	115

Lognormal distribution? r-squared is: 0.964
Normal distribution? r-squared is: 0.973
Recommendations:
Use lognormal distribution.

UCL (Land's method) 104

Beryllium 95% UCL Calculation

DATA	ID
0.26	J1K3P0/J1K3P4
0.28	J1K3N2
0.27	J1K3N3
0.28	J1K3N4
0.30	J1K3N5
0.29	J1K3N6
0.22	J1K3N7
0.29	J1K3N8
0.29	J1K3N9
0.25	J1K3P1
0.30	J1K3P2
0.24	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.27
Censored		Lognormal mean	0.27
Detection limit or PQL		Std. devn.	0.025
Method detection limit		Median	0.28
TOTAL	12	Min.	0.22
		Max.	0.30

Lognormal distribution? r-squared is: 0.895
Normal distribution? r-squared is: 0.913
Recommendations:
Use normal distribution.

UCL (based on t-statistic) 0.29

Boron 95% UCL Calculation

DATA	ID
2.2	J1K3P0/J1K3P4
1.8	J1K3N2
1.8	J1K3N3
1.1	J1K3N4
2.2	J1K3N5
2.9	J1K3N6
2.5	J1K3N7
2.4	J1K3N8
1.1	J1K3N9
1.8	J1K3P1
1.1	J1K3P2
1.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	1.8
Censored		Lognormal mean	1.8
Detection limit or PQL		Std. devn.	0.64
Method detection limit		Median	1.8
TOTAL	12	Min.	1.0
		Max.	2.9

Lognormal distribution? r-squared is: 0.904
Normal distribution? r-squared is: 0.931
Recommendations:
Use lognormal distribution.

UCL (Land's method) 2.3

Cadmium 95% UCL Calculation

DATA	ID
0.13	K3P0/J1K3P4
0.17	J1K3N2
0.11	J1K3N3
0.078	J1K3N4
0.16	J1K3N5
0.089	J1K3N6
0.11	J1K3N7
0.16	J1K3N8
0.084	J1K3N9
0.11	J1K3P1
0.097	J1K3P2
0.090	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.12
Censored		Lognormal mean	0.12
Detection limit or PQL		Std. devn.	0.032
Method detection limit		Median	0.11
TOTAL	12	Min.	0.08
		Max.	0.17

Lognormal distribution? r-squared is: 0.933
Normal distribution? r-squared is: 0.898
Recommendations:
Use lognormal distribution.

UCL (Land's method) 0.14

Chromium 95% UCL Calculation

DATA	ID
11.3	J1K3P0/J1K3P4
11.8	J1K3N2
11.3	J1K3N3
11.2	J1K3N4
13.0	J1K3N5
11.7	J1K3N6
9.6	J1K3N7
13.8	J1K3N8
12.0	J1K3N9
11.4	J1K3P1
11.6	J1K3P2
13.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	11.8
Censored		Lognormal mean	11.8
Detection limit or PQL		Std. devn.	1.1
Method detection limit		Median	11.7
TOTAL	12	Min.	9.6
		Max.	13.8

Lognormal distribution? r-squared is: 0.900
Normal distribution? r-squared is: 0.909
Recommendations:
Use lognormal distribution.

UCL (Land's method) 12.4

Cobalt 95% UCL Calculation

DATA	ID
6.5	J1K3P0/J1K3P4
6.2	J1K3N2
6.8	J1K3N3
7.0	J1K3N4
6.8	J1K3N5
6.7	J1K3N6
5.7	J1K3N7
6.9	J1K3N8
7.2	J1K3N9
6.6	J1K3P1
7.4	J1K3P2
6.4	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	6.7
Censored		Lognormal mean	6.7
Detection limit or PQL		Std. devn.	0.45
Method detection limit		Median	6.8
TOTAL	12	Min.	5.7
		Max.	7.4

Lognormal distribution? r-squared is: 0.948
Normal distribution? r-squared is: 0.964
Recommendations:
Use lognormal distribution.

UCL (Land's method) 6.9

Copper 95% UCL Calculation

DATA	ID
14.2	J1K3P0/J1K3P4
16.6	J1K3N2
15.6	J1K3N3
14.0	J1K3N4
17.1	J1K3N5
18.3	J1K3N6
13.9	J1K3N7
18.5	J1K3N8
15.8	J1K3N9
19.0	J1K3P1
13.7	J1K3P2
13.8	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	15.9
Censored		Lognormal mean	15.9
Detection limit or PQL		Std. devn.	2.0
Method detection limit		Median	15.7
TOTAL	12	Min.	13.7
		Max.	19.0

Lognormal distribution? r-squared is: 0.906
Normal distribution? r-squared is: 0.904
Recommendations:
Use lognormal distribution.

UCL (Land's method) 17.0

Lead 95% UCL Calculation

DATA	ID
7.6	J1K3P0/J1K3P4
7.8	J1K3N2
6.8	J1K3N3
9.0	J1K3N4
136	J1K3N5
6.4	J1K3N6
7.2	J1K3N7
12.6	J1K3N8
6.8	J1K3N9
9.5	J1K3P1
5.6	J1K3P2
5.5	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	18.4
Censored		Lognormal mean	13.9
Detection limit or PQL		Std. devn.	37.1
Method detection limit		Median	7.4
TOTAL	12	Min.	5.5
		Max.	136

Lognormal distribution? r-squared is: 0.542
Normal distribution? r-squared is: 0.339
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 36.0

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

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Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 North Excavation

Manganese 95% UCL Calculation

DATA	ID
305	J1K3P0/J1K3P4
298	J1K3N2
316	J1K3N3
337	J1K3N4
318	J1K3N5
297	J1K3N6
255	J1K3N7
319	J1K3N8
328	J1K3N9
300	J1K3P1
360	J1K3P2
303	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	311
Censored		Lognormal mean	311
Detection limit or PQL		Std. devn.	26
Method detection limit		Median	310
TOTAL	12	Min.	255
		Max.	360

Lognormal distribution? r-squared is: 0.763
Normal distribution? r-squared is: 0.335
Recommendations:
Use lognormal distribution.

UCL (Land's method) 326

Mercury 95% UCL Calculation

DATA	ID
0.022	J1K3P0/J1K3P4
0.026	J1K3N2
0.019	J1K3N3
0.011	J1K3N4
0.039	J1K3N5
0.017	J1K3N6
0.022	J1K3N7
0.026	J1K3N8
0.012	J1K3N9
0.021	J1K3P1
0.0095	J1K3P2
0.024	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.021
Censored		Lognormal mean	0.021
Detection limit or PQL		Std. devn.	0.0081
Method detection limit		Median	0.022
TOTAL	12	Min.	0.010
		Max.	0.039

Lognormal distribution? r-squared is: 0.941
Normal distribution? r-squared is: 0.922
Recommendations:
Use lognormal distribution.

UCL (Land's method) 0.027

Nickel 95% UCL Calculation

DATA	ID
11.3	J1K3P0/J1K3P4
11.4	J1K3N2
11.3	J1K3N3
11.0	J1K3N4
12.6	J1K3N5
11.4	J1K3N6
11.1	J1K3N7
13.3	J1K3N8
11.9	J1K3N9
12.1	J1K3P1
11.1	J1K3P2
11.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	11.6
Censored		Lognormal mean	11.6
Detection limit or PQL		Std. devn.	0.72
Method detection limit		Median	11.4
TOTAL	12	Min.	11.0
		Max.	13.3

Lognormal distribution? r-squared is: 0.837
Normal distribution? r-squared is: 0.823
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 12.0

Vanadium 95% UCL Calculation

DATA	ID
41.9	J1K3P0/J1K3P4
38.3	J1K3N2
42.6	J1K3N3
43.7	J1K3N4
42.1	J1K3N5
41.3	J1K3N6
35.2	J1K3N7
40.9	J1K3N8
45.3	J1K3N9
42.3	J1K3P1
43.3	J1K3P2
40.4	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	41.4
Censored		Lognormal mean	41.4
Detection limit or PQL		Std. devn.	2.6
Method detection limit		Median	42.0
TOTAL	12	Min.	35.2
		Max.	45.3

Lognormal distribution? r-squared is: 0.879
Normal distribution? r-squared is: 0.902
Recommendations:
Use normal distribution.

UCL (based on t-statistic) 42.8

Zinc 95% UCL Calculation

DATA	ID
51.8	J1K3P0/J1K3P4
49.9	J1K3N2
45.7	J1K3N3
39.3	J1K3N4
52.9	J1K3N5
41.6	J1K3N6
47.2	J1K3N7
64.7	J1K3N8
43.7	J1K3N9
64.0	J1K3P1
49.6	J1K3P2
41.6	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	49.3
Censored		Lognormal mean	49.4
Detection limit or PQL		Std. devn.	8.20
Method detection limit		Median	48.4
TOTAL	12	Min.	39.3
		Max.	64.7

Lognormal distribution? r-squared is: 0.939
Normal distribution? r-squared is: 0.905
Recommendations:
Use lognormal distribution.

UCL (Land's method) 53.9

SVOA- Bis(2-ethylhexyl)phthalate 95% UCL Calculation

DATA	ID
84.5	J1K3P0/J1K3P4
68	J1K3N2
91	J1K3N3
71	J1K3N4
24	J1KNK0
82	J1KNK1
87	J1K3N7
83	J1K3N8
71	J1K3N9
690	J1KNK2
77	J1K3P2
81	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	126
Censored		Lognormal mean	113
Detection limit or PQL		Std. devn.	179
Method detection limit		Median	82
TOTAL	12	Min.	24
		Max.	690

Lognormal distribution? r-squared is: 0.615
Normal distribution? r-squared is: 0.373
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 211

alpha-Chlordane 95% UCL Calculation

DATA	ID
2.2	J1K3P0/J1K3P4
7.3	J1K3N2
1.6	J1K3N3
1.6	J1K3N4
0.16	J1KNK0
1.4	J1KNK1
4.9	J1K3N7
28	J1K3N8
4.5	J1K3N9
1.7	J1KNK0
1.6	J1K3P2
0.15	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	4.6
Censored		Lognormal mean	5.5
Detection limit or PQL		Std. devn.	7.7
Method detection limit		Median	1.6
TOTAL	12	Min.	0.15
		Max.	28

Lognormal distribution? r-squared is: 0.902
Normal distribution? r-squared is: 0.527
Recommendations:
Use lognormal distribution.

UCL (Land's method) 30

Dieldrin 95% UCL Calculation

DATA	ID
5.7	J1K3P0/J1K3P4
32	J1K3N2
11	J1K3N3
1.1	J1K3N4
3.1	J1KNK0
1.5	J1KNK1
6.4	J1K3N7
2.2	J1K3N8
1.0	J1K3N9
1.1	J1KNK0
1.1	J1K3P2
0.10	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	5.5
Censored		Lognormal mean	6.7
Detection limit or PQL		Std. devn.	8.9
Method detection limit		Median	1.9
TOTAL	12	Min.	0.10
		Max.	32

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.579
Recommendations:
Use lognormal distribution.

UCL (Land's method) 37

gamma-Chlordane 95% UCL Calculation

DATA	ID
2.7	J1K3P0/J1K3P4
5.4	J1K3N2
1.3	J1K3N3
1.3	J1K3N4
0.13	J1KNK0
1.1	J1KNK1
6.0	J1K3N7
22	J1K3N8
3.3	J1K3N9
1.4	J1KNK0
1.3	J1K3P2
0.71	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	3.9
Censored		Lognormal mean	4.2
Detection limit or PQL		Std. devn.	6.0
Method detection limit		Median	1.3
TOTAL	12	Min.	0.13
		Max.	22

Lognormal distribution? r-squared is: 0.924
Normal distribution? r-squared is: 0.555
Recommendations:
Use lognormal distribution.

UCL (Land's method) 16

CALCULATION SHEET

Washington Closure Hanford
Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
Sheet No. 16 of 25

Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 North Excavation

Aroclor-1260 95% UCL Calculation

DATA	ID
18	J1K3P0/J1K3P4
27	J1K3N2
17	J1K3N3
1.3	J1K3N4
1.4	J1KNK0
3.1	J1KNK1
12	J1K3N7
29	J1K3N8
8.7	J1K3N9
1.4	J1KNK0
5.2	J1K3P2
1.2	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	10
Censored		Lognormal mean	13
Detection limit or PQL		Std. devn.	10
Method detection limit		Median	7.0
TOTAL	12	Min.	1.2
		Max.	29

Lognormal distribution? r-squared is: 0.905
Normal distribution? r-squared is: 0.867
Recommendations:
Use lognormal distribution.

UCL (Land's method) 46

PAH- Benzo(a)anthracene 95% UCL Calculation

DATA	ID
11	J1K3P0/J1K3P4
45	J1K3N2
1.6	J1K3N3
110	J1K3N4
1.6	J1KNK0
1.7	J1KNK1
53	J1K3N7
12	J1K3N8
8.2	J1K3N9
1.5	J1KNK0
22	J1K3P2
4.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	23
Censored		Lognormal mean	28
Detection limit or PQL		Std. devn.	33
Method detection limit		Median	10
TOTAL	12	Min.	1.5
		Max.	110

Lognormal distribution? r-squared is: 0.929
Normal distribution? r-squared is: 0.697
Recommendations:
Use lognormal distribution.

UCL (Land's method) 172

PAH- Benzo(a)pyrene 95% UCL Calculation

DATA	ID
16	J1K3P0/J1K3P4
44	J1K3N2
13	J1K3N3
95	J1K3N4
3.3	J1KNK0
3.3	J1KNK1
67	J1K3N7
15	J1K3N8
8.2	J1K3N9
120	J1KNK0
22	J1K3P2
16	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	35
Censored		Lognormal mean	40
Detection limit or PQL		Std. devn.	39
Method detection limit		Median	16
TOTAL	12	Min.	3.3
		Max.	120

Lognormal distribution? r-squared is: 0.957
Normal distribution? r-squared is: 0.792
Recommendations:
Use lognormal distribution.

UCL (Land's method) 127

PAH- Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
24	J1K3P0/J1K3P4
37	J1K3N2
12	J1K3N3
92	J1K3N4
2.1	J1KNK0
2.2	J1KNK1
67	J1K3N7
2.1	J1K3N8
14	J1K3N9
2.0	J1KNK0
20	J1K3P2
19	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	24
Censored		Lognormal mean	31
Detection limit or PQL		Std. devn.	28
Method detection limit		Median	17
TOTAL	12	Min.	2.0
		Max.	92

Lognormal distribution? r-squared is: 0.903
Normal distribution? r-squared is: 0.785
Recommendations:
Use lognormal distribution.

UCL (Land's method) 149

PAH- Benzo(k)fluoranthene 95% UCL Calculation

DATA	ID
6.8	J1K3P0/J1K3P4
17	J1K3N2
5.1	J1K3N3
56	J1K3N4
2.0	J1KNK0
2.1	J1KNK1
24	J1K3N7
2.0	J1K3N8
5.2	J1K3N9
1.9	J1KNK0
8.4	J1K3P2
7.1	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	11
Censored		Lognormal mean	11
Detection limit or PQL		Std. devn.	16
Method detection limit		Median	6
TOTAL	12	Min.	1.9
		Max.	56

Lognormal distribution? r-squared is: 0.919
Normal distribution? r-squared is: 0.634
Recommendations:
Use lognormal distribution.

UCL (Land's method) 31

PAH- Chrysene 95% UCL Calculation

DATA	ID
19	J1K3P0/J1K3P4
51	J1K3N2
17	J1K3N3
97	J1K3N4
2.5	J1KNK0
2.5	J1KNK1
75	J1K3N7
2.4	J1K3N8
19	J1K3N9
2.3	J1KNK0
29	J1K3P2
9.1	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	27
Censored		Lognormal mean	34
Detection limit or PQL		Std. devn.	31
Method detection limit		Median	18
TOTAL	12	Min.	2.3
		Max.	97

Lognormal distribution? r-squared is: 0.913
Normal distribution? r-squared is: 0.801
Recommendations:
Use lognormal distribution.

UCL (Land's method) 161

PAH- Fluoranthene 95% UCL Calculation

DATA	ID
16.5	J1K3P0/J1K3P4
95	J1K3N2
23	J1K3N3
260	J1K3N4
6.5	J1KNK0
6.5	J1KNK1
120	J1K3N7
18	J1K3N8
18	J1K3N9
36	J1KNK0
52	J1K3P2
6.5	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	55
Censored		Lognormal mean	57
Detection limit or PQL		Std. devn.	74
Method detection limit		Median	21
TOTAL	12	Min.	6.5
		Max.	260

Lognormal distribution? r-squared is: 0.944
Normal distribution? r-squared is: 0.677
Recommendations:
Use lognormal distribution.

UCL (Land's method) 192

PAH- Phenanthrene 95% UCL Calculation

DATA	ID
5.5	J1K3P0/J1K3P4
65	J1K3N2
6.0	J1K3N3
170	J1K3N4
6.0	J1KNK0
6.0	J1KNK1
100	J1K3N7
12	J1K3N8
6.0	J1K3N9
19	J1KNK0
46	J1K3P2
6.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	37
Censored		Lognormal mean	38
Detection limit or PQL		Std. devn.	52
Method detection limit		Median	9.0
TOTAL	12	Min.	5.5
		Max.	170

Lognormal distribution? r-squared is: 0.828
Normal distribution? r-squared is: 0.690
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 62

PAH- Pyrene 95% UCL Calculation

DATA	ID
18	J1K3P0/J1K3P4
76	J1K3N2
17	J1K3N3
230	J1K3N4
6.0	J1KNK0
6.0	J1KNK1
140	J1K3N7
16	J1K3N8
16	J1K3N9
19	J1KNK0
59	J1K3P2
6.0	J1K3P3

Number of samples		Uncensored values	
Uncensored	12	Mean	51
Censored		Lognormal mean	52
Detection limit or PQL		Std. devn.	69
Method detection limit		Median	17
TOTAL	12	Min.	6.0
		Max.	230

Lognormal distribution? r-squared is: 0.907
Normal distribution? r-squared is: 0.683
Recommendations:
Use lognormal distribution.

UCL (Land's method) 182

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi N.K. | Date 09/29/11 | Calc. No. 0100F-CA-V0392 | Rev. No. 0
Project 100-F Field Remediation | Job No. 14655 | Checked J. D. Skoglie | Date 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations | Sheet No. 17 of 25

Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 South Excavation

Arsenic 95% UCL Calculation

DATA	ID
2.0	J1K3V4/J1K3V5
2.4	J1K3T3
2.7	J1K3T4
2.4	J1K3T5
2.3	J1K3T6
2.3	J1K3T7
1.9	J1K3T8
1.9	J1K3T9
5.4	J1K3V0
3.1	J1K3V1
2.5	J1K3V2
1.5	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	2.5
Censored		Lognormal mean	2.5
Detection limit or PQL		Std. devn.	1.0
Method detection limit		Median	2.4
TOTAL	12	Min.	1.5
		Max.	5.4

Lognormal distribution? r-squared is: 0.855
Normal distribution? r-squared is: 0.698
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 3.0

Barium 95% UCL Calculation

DATA	ID
74.9	J1K3V4/J1K3V5
50.3	J1K3T3
80.6	J1K3T4
58.2	J1K3T5
69.8	J1K3T6
69.2	J1K3T7
120	J1K3T8
74.1	J1K3T9
50.0	J1K3V0
116	J1K3V1
67.2	J1K3V2
41.0	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	72.6
Censored		Lognormal mean	72.8
Detection limit or PQL		Std. devn.	24.2
Method detection limit		Median	69.5
TOTAL	12	Min.	41.0
		Max.	120

Lognormal distribution? r-squared is: 0.949
Normal distribution? r-squared is: 0.886
Recommendations:
Use lognormal distribution.

UCL (Land's method) 87.8

Beryllium 95% UCL Calculation

DATA	ID
0.12	J1K3V4/J1K3V5
0.097	J1K3T3
0.13	J1K3T4
0.12	J1K3T5
0.12	J1K3T6
0.15	J1K3T7
0.12	J1K3T8
0.12	J1K3T9
0.12	J1K3V0
0.21	J1K3V1
0.15	J1K3V2
0.093	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.13
Censored		Lognormal mean	0.13
Detection limit or PQL		Std. devn.	0.031
Method detection limit		Median	0.12
TOTAL	12	Min.	0.093
		Max.	0.21

Lognormal distribution? r-squared is: 0.845
Normal distribution? r-squared is: 0.772
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 0.14

Boron 95% UCL Calculation

DATA	ID
2.9	J1K3V4/J1K3V5
1.9	J1K3T3
3.6	J1K3T4
2.2	J1K3T5
2.9	J1K3T6
3.0	J1K3T7
7.3	J1K3T8
3.0	J1K3T9
1.4	J1K3V0
6.6	J1K3V1
2.2	J1K3V2
0.45	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	3.1
Censored		Lognormal mean	3.3
Detection limit or PQL		Std. devn.	2.0
Method detection limit		Median	2.9
TOTAL	12	Min.	0.45
		Max.	7.3

Lognormal distribution? r-squared is: 0.883
Normal distribution? r-squared is: 0.848
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 4.1

Cadmium 95% UCL Calculation

DATA	ID
0.063	J1K3V4/J1K3V5
0.059	J1K3T3
0.080	J1K3T4
0.078	J1K3T5
0.079	J1K3T6
0.16	J1K3T7
0.079	J1K3T8
0.077	J1K3T9
0.075	J1K3V0
0.11	J1K3V1
0.083	J1K3V2
0.065	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	0.084
Censored		Lognormal mean	0.084
Detection limit or PQL		Std. devn.	0.027
Method detection limit		Median	0.079
TOTAL	12	Min.	0.059
		Max.	0.16

Lognormal distribution? r-squared is: 0.804
Normal distribution? r-squared is: 0.690
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 0.097

Chromium 95% UCL Calculation

DATA	ID
9.6	J1K3V4/J1K3V5
10.2	J1K3T3
13.4	J1K3T4
10.9	J1K3T5
9.5	J1K3T6
10.1	J1K3T7
10.1	J1K3T8
9.2	J1K3T9
11.5	J1K3V0
12.7	J1K3V1
11.8	J1K3V2
11.1	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	10.8
Censored		Lognormal mean	10.8
Detection limit or PQL		Std. devn.	1.3
Method detection limit		Median	10.6
TOTAL	12	Min.	9.2
		Max.	13.4

Lognormal distribution? r-squared is: 0.961
Normal distribution? r-squared is: 0.946
Recommendations:
Use lognormal distribution.

UCL (Land's method) 11.6

Cobalt 95% UCL Calculation

DATA	ID
6.0	J1K3V4/J1K3V5
6.0	J1K3T3
6.5	J1K3T4
6.0	J1K3T5
6.4	J1K3T6
6.4	J1K3T7
5.5	J1K3T8
6.3	J1K3T9
5.9	J1K3V0
6.8	J1K3V1
6.3	J1K3V2
6.5	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	6.2
Censored		Lognormal mean	6.2
Detection limit or PQL		Std. devn.	0.35
Method detection limit		Median	6.3
TOTAL	12	Min.	5.5
		Max.	6.8

Lognormal distribution? r-squared is: 0.940
Normal distribution? r-squared is: 0.948
Recommendations:
Use lognormal distribution.

UCL (Land's method) 6.4

Copper 95% UCL Calculation

DATA	ID
11.8	J1K3V4/J1K3V5
12.4	J1K3T3
14.3	J1K3T4
12.5	J1K3T5
11.8	J1K3T6
13.4	J1K3T7
11.9	J1K3T8
12.8	J1K3T9
13.2	J1K3V0
14.9	J1K3V1
13.6	J1K3V2
11.9	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	12.9
Censored		Lognormal mean	12.9
Detection limit or PQL		Std. devn.	1.0
Method detection limit		Median	12.7
TOTAL	12	Min.	11.8
		Max.	14.9

Lognormal distribution? r-squared is: 0.930
Normal distribution? r-squared is: 0.922
Recommendations:
Use lognormal distribution.

UCL (Land's method) 13.4

Lead 95% UCL Calculation

DATA	ID
4.7	J1K3V4/J1K3V5
4.2	J1K3T3
5.8	J1K3T4
5.9	J1K3T5
6.1	J1K3T6
5.1	J1K3T7
3.4	J1K3T8
4.6	J1K3T9
3.9	J1K3V0
6.5	J1K3V1
6.0	J1K3V2
2.9	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	4.9
Censored		Lognormal mean	4.9
Detection limit or PQL		Std. devn.	1.2
Method detection limit		Median	4.9
TOTAL	12	Min.	2.9
		Max.	6.5

Lognormal distribution? r-squared is: 0.936
Normal distribution? r-squared is: 0.958
Recommendations:
Use lognormal distribution.

UCL (Land's method) 5.7

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
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Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 South Excavation

Manganese 95% UCL Calculation

DATA	ID
233	J1K3V4/J1K3V5
242	J1K3T3
246	J1K3T4
240	J1K3T5
267	J1K3T6
261	J1K3T7
244	J1K3T8
251	J1K3T9
257	J1K3V0
267	J1K3V1
262	J1K3V2
223	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	249
Censored		Lognormal mean	249
Detection limit or PQL		Std. devn.	14
Method detection limit		Median	249
TOTAL	12	Min.	223
		Max.	267

Lognormal distribution? r-squared is: 0.957
Normal distribution? r-squared is: 0.962
Recommendations:
Use lognormal distribution.

UCL (Land's method) 257

Mercury 95% UCL Calculation

DATA	ID
1.7	J1K3V4/J1K3V5
0.79	J1K3T3
4.2	J1K3T4
2.4	J1K3T5
0.13	J1K3T6
15.8	J1K3T7
0.18	J1K3T8
0.15	J1K3T9
1.1	J1K3V0
0.12	J1K3V1
0.10	J1K3V2
0.083	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	2.2
Censored		Lognormal mean	2.5
Detection limit or PQL		Std. devn.	4.5
Method detection limit		Median	0.49
TOTAL	12	Min.	0.083
		Max.	15.8

Lognormal distribution? r-squared is: 0.908
Normal distribution? r-squared is: 0.513
Recommendations:
Use Gamma distribution.

UCL (Approximate Gamma) is 6.8

Nickel 95% UCL Calculation

DATA	ID
10.4	J1K3V4/J1K3V5
11.3	J1K3T3
17.1	J1K3T4
10.2	J1K3T5
10.9	J1K3T6
10.5	J1K3T7
11.1	J1K3T8
10.7	J1K3T9
11.6	J1K3V0
12.8	J1K3V1
11.0	J1K3V2
12.6	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	11.7
Censored		Lognormal mean	11.7
Detection limit or PQL		Std. devn.	1.9
Method detection limit		Median	11.1
TOTAL	12	Min.	10.2
		Max.	17.1

Lognormal distribution? r-squared is: 0.745
Normal distribution? r-squared is: 0.681
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 12.6

Vanadium 95% UCL Calculation

DATA	ID
36.3	J1K3V4/J1K3V5
39.1	J1K3T3
38.3	J1K3T4
39.0	J1K3T5
39.5	J1K3T6
39.0	J1K3T7
36.5	J1K3T8
40.9	J1K3T9
37.7	J1K3V0
40.3	J1K3V1
38.3	J1K3V2
35.9	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	38.4
Censored		Lognormal mean	38.4
Detection limit or PQL		Std. devn.	1.6
Method detection limit		Median	38.7
TOTAL	12	Min.	35.9
		Max.	40.9

Lognormal distribution? r-squared is: 0.961
Normal distribution? r-squared is: 0.964
Recommendations:
Use lognormal distribution.

UCL (Land's method) 39.2

Zinc 95% UCL Calculation

DATA	ID
34.3	J1K3V4/J1K3V5
34.5	J1K3T3
37.1	J1K3T4
37.3	J1K3T5
36.2	J1K3T6
84.1	J1K3T7
35.5	J1K3T8
37.9	J1K3T9
33.2	J1K3V0
59.3	J1K3V1
38.3	J1K3V2
29.9	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	41.5
Censored		Lognormal mean	41.3
Detection limit or PQL		Std. devn.	15.3
Method detection limit		Median	36.7
TOTAL	12	Min.	29.9
		Max.	84.1

Lognormal distribution? r-squared is: 0.691
Normal distribution? r-squared is: 0.602
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 48.7

PAH- Anthracene 95% UCL Calculation

DATA	ID
1.7	J1KNL1/J1KNL2
6.4	J1K3T3
1.7	J1KNK5
1.5	J1KNK6
17	J1K3T6
14	J1K3T7
1.4	J1KNK7
21	J1KNK8
22	J1K3V0
1.5	J1KNK9
1.5	J1KNL0
8.5	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	8.2
Censored		Lognormal mean	9.2
Detection limit or PQL		Std. devn.	8.2
Method detection limit		Median	4.0
TOTAL	12	Min.	1.4
		Max.	22

Lognormal distribution? r-squared is: 0.823
Normal distribution? r-squared is: 0.817
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 12

PAH- Benzo(a)anthracene 95% UCL Calculation

DATA	ID
7.4	J1KNL1/J1KNL2
56	J1K3T3
16	J1KNK5
1.6	J1KNK6
110	J1K3T6
85	J1K3T7
1.5	J1KNK7
140	J1KNK8
94	J1K3V0
17	J1KNK9
1.5	J1KNL0
51	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	48
Censored		Lognormal mean	90
Detection limit or PQL		Std. devn.	49
Method detection limit		Median	34
TOTAL	12	Min.	1.5
		Max.	140

Lognormal distribution? r-squared is: 0.885
Normal distribution? r-squared is: 0.891
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 71

PAH- Benzo(a)pyrene 95% UCL Calculation

DATA	ID
6.4	J1KNL1/J1KNL2
37	J1K3T3
17	J1KNK5
3.1	J1KNK6
96	J1K3T6
78	J1K3T7
3.0	J1KNK7
120	J1KNK8
79	J1K3V0
20	J1KNK9
3.1	J1KNL0
33	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	41
Censored		Lognormal mean	56
Detection limit or PQL		Std. devn.	41
Method detection limit		Median	27
TOTAL	12	Min.	3.0
		Max.	120

Lognormal distribution? r-squared is: 0.913
Normal distribution? r-squared is: 0.871
Recommendations:
Use Gamma distribution.

UCL (Approximate Gamma) is 82

PAH- Benzo(b)fluoranthene 95% UCL Calculation

DATA	ID
5.1	KNL1/J1KNL2
31	J1K3T3
12	J1KNK5
2.1	J1KNK6
69	J1K3T6
45	J1K3T7
2.0	J1KNK7
90	J1KNK8
53	J1K3V0
11	J1KNK9
2.0	J1KNL0
23	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	29
Censored		Lognormal mean	39
Detection limit or PQL		Std. devn.	29
Method detection limit		Median	18
TOTAL	12	Min.	2.0
		Max.	90

Lognormal distribution? r-squared is: 0.927
Normal distribution? r-squared is: 0.877
Recommendations:
Use lognormal distribution.

UCL (Land's method) 196

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi N.K.
Project 100-F Field Remediation
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations

Date 09/29/11
Job No. 14655

Calc. No. 0100F-CA-V0392
Checked J. D. Skoglie

Rev. No. 0
Date 09/29/11
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Ecology Software (MTCAStat) Results, 100-F-55/100-F-62 South Excavation

PAH- Benzo(k)fluoranthene 95% UCL Calculation

DATA	ID
3.6	J1KNL1/J1KNL2
15	J1K3T3
6.2	J1KNK5
1.9	J1KNK6
46	J1K3T6
35	J1K3T7
1.9	J1KNK7
57	J1KNK8
35	J1K3V0
8.0	J1KNK9
1.9	J1KNL0
12	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	19
Censored		Lognormal mean	22
Detection limit or PQL		Std. devn.	19
Method detection limit		Median	10
TOTAL	12	Min.	1.9
		Max.	57

Lognormal distribution? r-squared is: 0.931
Normal distribution? r-squared is: 0.840
Recommendations:
Use lognormal distribution.

UCL (Land's method) 87

PAH- Chrysene 95% UCL Calculation

DATA	ID
7.9	J1KNL1/J1KNL2
42	J1K3T3
17	J1KNK5
2.4	J1KNK6
100	J1K3T6
79	J1K3T7
2.3	J1KNK7
140	J1KNK8
90	J1K3V0
17	J1KNK9
2.3	J1KNL0
40	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	45
Censored		Lognormal mean	67
Detection limit or PQL		Std. devn.	46
Method detection limit		Median	29
TOTAL	12	Min.	2.3
		Max.	140

Lognormal distribution? r-squared is: 0.912
Normal distribution? r-squared is: 0.873
Recommendations:
Use lognormal distribution.

UCL (Land's method) 440

PAH- Fluoranthene 95% UCL Calculation

DATA	ID
16	J1KNL1/J1KNL2
71	J1K3T3
25	J1KNK5
6.5	J1KNK6
190	J1K3T6
130	J1K3T7
6.0	J1KNK7
250	J1KNK8
160	J1K3V0
26	J1KNK9
6.0	J1KNL0
73	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	80
Censored		Lognormal mean	104
Detection limit or PQL		Std. devn.	83
Method detection limit		Median	49
TOTAL	12	Min.	6.0
		Max.	250

Lognormal distribution? r-squared is: 0.928
Normal distribution? r-squared is: 0.861
Recommendations:
Use lognormal distribution.

UCL (Land's method) 492

PAH- Phenanthrene 95% UCL Calculation

DATA	ID
9.5	J1KNL1/J1KNL2
19	J1K3T3
6.5	J1KNK5
6.0	J1KNK6
72	J1K3T6
42	J1K3T7
5.5	J1KNK7
87	J1KNK8
63	J1K3V0
5.5	J1KNK9
5.5	J1KNL0
30	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	29
Censored		Lognormal mean	32
Detection limit or PQL		Std. devn.	30
Method detection limit		Median	14
TOTAL	12	Min.	5.5
		Max.	87

Lognormal distribution? r-squared is: 0.873
Normal distribution? r-squared is: 0.821
Recommendations:
Reject BOTH lognormal and normal distributions.

UCL (based on Z-statistic) 43

PAH- Pyrene 95% UCL Calculation

DATA	ID
19	J1KNL1/J1KNL2
83	J1K3T3
31	J1KNK5
6.0	J1KNK6
250	J1K3T6
160	J1K3T7
5.5	J1KNK7
220	J1KNK8
190	J1K3V0
36	J1KNK9
5.5	J1KNL0
90	J1K3V3

Number of samples		Uncensored values	
Uncensored	12	Mean	91
Censored		Lognormal mean	129
Detection limit or PQL		Std. devn.	91
Method detection limit		Median	60
TOTAL	12	Min.	5.5
		Max.	250

Lognormal distribution? r-squared is: 0.912
Normal distribution? r-squared is: 0.876
Recommendations:
Use lognormal distribution.

UCL (Land's method) 709

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 20 of 25

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Excavation

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
NX-9	J1K3P0	6/29/2011	8350		1.5	3.0		0.63	101		0.072	0.26		0.031	1.9		0.93	0.12	B	0.039	4690		13.4	11.3		0.055
Duplicate of J1K3P0	J1K3P4	6/29/2011	8400		1.4	3.1		0.61	104		0.071	0.26		0.031	2.4		0.91	0.14	B	0.038	4730		13.1	11.3		0.054

Analysis:

TDL			5			10			2			0.2			2			0.2			100			1		
Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?		Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)		
	RPD		0.6%						2.9%												0.8%			0.0%		
	Difference > 2 TDL?		Not applicable			No - acceptable			Not applicable			No - acceptable			No - acceptable			No - acceptable			Not applicable			Not applicable		

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Excavation

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Mercury			Nickel		
			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
NX-9	J1K3P0	6/29/2011	6.5	X	0.095	13.8		0.21	18100		3.6	7.5		0.26	4140		3.5	312		0.095	0.020		0.0051	11.5	X	0.12
Duplicate of J1K3P0	J1K3P4	6/29/2011	6.5	X	0.093	14.5		0.20	17400		3.5	7.6		0.25	4120		3.4	297		0.093	0.024		0.0050	11.1	X	0.11

Analysis:

TDL			2			1			5			5			75			5			0.2			4		
Duplicate Analysis	Both > PQL?		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)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)		
	RPD					4.9%			3.9%						0.5%			4.9%								
	Difference > 2 TDL?		No - acceptable			Not applicable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable		

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Excavation

Sampling Area	HEIS Number	Sample Date	Potassium			Silicon			Sodium			Vanadium			Zinc			SVOA- Bis(2-ethylhexyl) phthalate			4,4'-DDE			4,4'-DDT		
			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
NX-9	J1K3P0	6/29/2011	1600		39.0	226		5.4	204		56.1	42.5		0.089	52.9		0.38	90	JB	44	4.4	JXD	2.2	7.4	JD	5.5
Duplicate of J1K3P0	J1K3P4	6/29/2011	1610		38.2	228		5.3	232		55.0	41.2		0.088	50.7		0.37	79	JB	46	6.9		0.23	5.9		0.56

Analysis:

TDL			400			2			50			2.5			1			660			5			5		
Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)		
	Both >5xTDL?		No-Stop (acceptable)			Yes (calc RPD)			No-Stop (acceptable)			Yes (calc RPD)			Yes (calc RPD)			No-Stop (acceptable)			No-Stop (acceptable)			No-Stop (acceptable)		
	RPD					0.9%						3.1%			4.2%											
	Difference > 2 TDL?		No - acceptable			Not applicable			No - acceptable			Not applicable			Not applicable			No - acceptable			No - acceptable			No - acceptable		

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Excavation

Sampling Area	HEIS Number	Sample Date	Dieldrin			gamma-Chlordane			Aroclor-1260			PAH- Benzo(a)anthracene			PAH- Benzo(a)pyrene			PAH- Benzo(b)fluoranthene			PAH- Benzo(k)fluoranthene			PAH- Chrysene		
			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
NX-9	J1K3P0	6/29/2011	3.4	JX	2.0	3.6	JD	2.5	16	P	2.4	7.7	J	3.0	12	J	6.1	13	JX	4.0	5.2	J	3.7	13	J	4.6
Duplicate of J1K3P0	J1K3P4	6/29/2011	7.9		0.20	1.7		0.25	20	P	2.5	15		3.0	20		6.1	35	X	4.0	8.3	J	3.7	25	J	4.6

Analysis:

TDL			5			5			20			15			15			15			15			15		
Duplicate Analysis	Both > PQL?		Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			Yes (continue)			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)		
	RPD																									
	Difference > 2 TDL?		No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable			No - acceptable		

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0

Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11

Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 21 of 25

1 **Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Excavation**

	Sampling Area	HEIS Number	Sample Date	PAH- Fluoranthene			PAH- Indeno(1,2,3-cd)pyrene			PAH- Pyrene		
2												
3				ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
4	NX-9	J1K3P0	6/29/2011	15	J	12	11	J	11	19	J	11
5	Duplicate of J1K3P0	J1K3P4	6/29/2011	18	JX	12	19	J	11	16	J	11

6 **Analysis:**

7	TDL		15	15	15
8	Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	Yes (continue)
9		Both >5xTDL?	No-Stop (acceptable)		No-Stop (acceptable)
10		RPD			
11		Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 22 of 25

Duplicate Analysis - 100-F-55/100-F-62 Waste Site South Excavation-Initial Data

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SX-12	J1K3V4	7/5/2011	6320		1.4	1.9		0.59	76.1		0.068	0.12	B	0.029	3.0		0.87	0.049	B	0.037	4820		12.6	10		0.052
Duplicate of J1K3V4	J1K3V5	7/5/2011	6270		1.5	2.1		0.62	73.7		0.072	0.12	B	0.031	2.7		0.92	0.077	B	0.039	5220		13.3	9.2		0.055

Analysis:

TDL		5	10	2	0.2	2	0.2	100	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	0.8%		3.2%				8.0%	8.3%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site South Excavation-Initial Data

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Mercury			Nickel		
			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
SX-12	J1K3V4	7/5/2011	6.0	X	0.089	11.9		0.19	14700		3.4	4.6		0.24	4170		3.3	233		0.089	1.8		0.027	10.5		0.11
Duplicate of J1K3V4	J1K3V5	7/5/2011	5.9	X	0.094	11.7		0.20	14500		3.6	4.8		0.25	3980		3.5	233		0.094	1.5		0.027	10.3		0.12

Analysis:

TDL		2	1	5	5	75	5	0.2	4
Duplicate Analysis	Both > PQL?	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)	Yes (calc RPD)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)
	RPD		1.7%	1.4%		4.7%	0.0%	18.2%	
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site South Excavation-Initial Data

Sampling Area	HEIS Number	Sample Date	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
SX-12	J1K3V4	7/5/2011	860		36.5	382	X	5.0	242		52.6	36.8		0.084	33.7		0.35
Duplicate of J1K3V4	J1K3V5	7/5/2011	904		38.6	323	X	5.3	219		55.5	35.8		0.088	34.8		0.37

Analysis:

TDL		400	2	50	2.5	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD		16.7%		2.8%	3.2%
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 23 of 25

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-East Stockpile

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-8	J1K3V7	7/5/2011	7150		1.3	3.9		0.56	77.3		0.065	0.23		0.028	2.2		0.84	0.093	B	0.035	4730		12.1	10.2		0.050
Duplicate of J1K3V7	J1K3W4	7/5/2011	7310		1.6	2.4		0.67	146		0.077	0.28		0.034	6.8		0.99	0.081	B	0.042	5110		14.3	8.9		0.059

Analysis:

TDL		5	10	2	0.2	2	0.2	100	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	2.2%		*61.5%*				7.7%	13.6%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	Yes - assess further	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-East Stockpile

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			Iron			Lead			Magnesium			Manganese			Mercury			Nickel		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-8	J1K3V7	7/5/2011	5.7	X	0.085	12.0		0.19	14900		3.2	5.6		0.23	4020		3.2	253		0.085	0.53		0.0049	10.9		0.11
Duplicate of J1K3V7	J1K3W4	7/5/2011	6.4	X	0.10	13.4		0.22	16400		3.9	5.0		0.27	4150		3.8	265		0.10	0.42		0.0058	10.6		0.12

Analysis:

TDL		2	1	5	5	75	5	0.2	4
Duplicate Analysis	Both > PQL?	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)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD		11.0%	9.6%		3.2%	4.6%		
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-East Stockpile

Sampling Area	HEIS Number	Sample Date	Potassium			Silicon			Sodium			Vanadium			Zinc			SVOA- Phenol			PAH- Anthracene			PAH- Benzo(a)anthracene		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SPA-8	J1K3V7	7/5/2011	1320		35.0	248		4.8	241		50.4	38.2		0.080	32.8		0.34	80	J	18	7.5	JX	2.9	62	X	3.0
Duplicate of J1K3V7	J1K3W4	7/5/2011	1330		41.6	329		5.7	331		59.9	42.6		0.095	36.9		0.40	31	J	20	26		3.3	110		3.5

Analysis:

TDL		400	2	50	2.5	1	660	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD		28.1%		10.9%	11.8%			
	Difference > 2 TDL?	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Yes - assess further

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-East Stockpile

Sampling Area	HEIS Number	Sample Date	PAH- Benzo(a)pyrene			PAH- Benzo(b)fluoranthene			PAH- Benzo(ghi)perylene			PAH- Benzo(k)fluoranthene			PAH- Chrysene			PAH- Fluoranthene			PAH- Indeno(1,2,3-cd)pyrene			PAH- Phenanthrene		
			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
SPA-8	J1K3V7	7/5/2011	46		6.1	37	X	4.0	27	J	6.9	19		3.8	57		4.6	110		12	28	J	11	39		11
Duplicate of J1K3V7	J1K3W4	7/5/2011	86		7.0	62		4.6	21	JX	7.9	43		4.3	100		5.3	200		14	49		13	93		13

Analysis:

TDL		15	15	15	15	15	15	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD						*58.1%*		
	Difference > 2 TDL?	Yes - assess further	No - acceptable	No - acceptable	No - acceptable	Yes - assess further	Not applicable	No - acceptable	Yes - assess further

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 24 of 25

1 **Duplicate Analysis - 100-F-55/100-F-62 Waste Site-East Stockpile**

2	Sampling	HEIS	Sample	PAH- Pyrene		
3	Area	Number	Date	ug/kg	Q	PQL
4	SPA-8	J1K3V7	7/5/2011	130		11
5	Duplicate of J1K3V7	J1K3W4	7/5/2011	160	X	13

6 **Analysis:**

7	TDL		15
8	Duplicate Analysis	Both > PQL?	Yes (continue)
9		Both >5xTDL?	Yes (calc RPD)
10		RPD	20.7%
11		Difference > 2 TDL?	Not applicable

CALCULATION SHEET

Washington Closure Hanford

Originator N. Kobayashi n.k. **Date** 09/29/11 **Calc. No.** 0100F-CA-V0392 **Rev. No.** 0
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. D. Skoglie **Date** 09/29/11
Subject 100-F-55/100-F-62 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 25 of 25

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Stockpile

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-1	J1K3R4	6/29/2011	9610		1.5	3.6		0.63	122		0.072	0.32		0.031	2.8		0.93	0.21		0.039	4740		13.4	16.3		0.055
Duplicate of J1K3R4	J1K3T0	6/29/2011	8490		1.5	3.3		0.62	138		0.072	0.30		0.031	4.1		0.92	0.20		0.039	4950		13.3	13.4		0.055

Analysis:

TDL		5	10	2	0.2	2	0.2	100	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)
	RPD	12.4%		12.3%				4.3%	19.5%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Stockpile

Sampling Area	HEIS Number	Sample Date	Cobalt			Copper			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	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-1	J1K3R4	6/29/2011	6.8	X	0.095	17.5		0.21	18100		3.6	13.4	X	0.26	4990		3.5	324		0.095	0.033	N	0.0048	0.36	B	0.25
Duplicate of J1K3R4	J1K3T0	6/29/2011	6.2	X	0.094	16.9		0.20	16400		3.6	12.2	X	0.25	4480		3.5	303		0.094	0.026		0.0054	0.35	B	0.24

Analysis:

TDL		2	1	5	5	75	5	0.2	2
Duplicate Analysis	Both > PQL?	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)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD		3.5%	9.9%		10.8%	6.7%		
	Difference > 2 TDL?	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Stockpile

Sampling Area	HEIS Number	Sample Date	Nickel			Potassium			Silicon			Sodium			Vanadium			Zinc			Aroclor-1260			PAH- Benzo(a)pyrene		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SPA-1	J1K3R4	6/29/2011	14.5	X	0.12	1760		39.0	310	XNJ	5.4	242		56.1	38.5		0.089	63.4	X	0.38	2.9	J	2.6	18		6.3
Duplicate of J1K3R4	J1K3T0	6/29/2011	12.4	X	0.12	1500		38.6	235	XJ	5.3	253		55.5	37.7		0.088	57.8	X	0.37	7.2	J	2.5	16		6.0

Analysis:

TDL		4	400	2	50	2.5	1	20	15
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD			27.5%		2.1%	9.2%		
	Difference > 2 TDL?	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable

Duplicate Analysis - 100-F-55/100-F-62 Waste Site-North Stockpile

Sampling Area	HEIS Number	Sample Date	PAH- Fluoranthene			PAH-Indeno(1,2,3-cd)pyrene			PAH- Phenanthrene			PAH- Pyrene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SPA-1	J1K3R4	6/29/2011	26	J	13	16	J	12	12	JX	12	25	JX	12
Duplicate of J1K3R4	J1K3T0	6/29/2011	38		12	11	J	11	21	JX	11	30	JX	11

Analysis:

TDL		15	15	15	15
Duplicate Analysis	Both > PQL?	Yes (continue)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (continue)
	Both >5xTDL?	No-Stop (acceptable)			No-Stop (acceptable)
	RPD				
	Difference > 2 TDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Metals)

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
NX-9	J1K3P0	6/29/2011	8350		1.5	0.36	U	0.36	3.0		0.63	101		0.072	0.26		0.031	1.9		0.93
Duplicate of J1K3P0	J1K3P4	6/29/2011	8400		1.4	0.35	U	0.35	3.1		0.61	104		0.071	0.26		0.031	2.4		0.91
NX-1	J1K3N2	6/29/2011	8660		1.4	0.34	U	0.34	3.0		0.59	92.9		0.068	0.28		0.030	1.8		0.88
NX-2	J1K3N3	6/29/2011	8760		1.4	0.35	U	0.35	2.9		0.60	93.3		0.069	0.27		0.030	1.8		0.89
NX-3	J1K3N4	6/29/2011	9090		1.5	0.38	U	0.38	3.0		0.66	82.4		0.076	0.28		0.033	1.1	B	0.98
NX-4	J1K3N5	6/29/2011	9280		1.4	0.35	U	0.35	3.0		0.61	110		0.070	0.30		0.030	2.2		0.90
NX-5	J1K3N6	6/29/2011	8580		1.5	0.37	U	0.37	3.1		0.65	107		0.075	0.29		0.033	2.9		0.97
NX-6	J1K3N7	6/29/2011	7180		1.5	0.37	U	0.37	2.6		0.64	101		0.074	0.22		0.032	2.5		0.95
NX-7	J1K3N8	6/29/2011	9270		1.5	0.38	U	0.38	4.3		0.66	115		0.076	0.29		0.033	2.4		0.98
NX-8	J1K3N9	6/29/2011	9250		1.5	0.37	U	0.37	2.8		0.65	89.0		0.075	0.29		0.033	1.1	B	0.97
NX-10	J1K3P1	6/29/2011	8210		1.5	0.36	U	0.36	3.1		0.63	103		0.072	0.25		0.031	1.8	B	0.93
NX-11	J1K3P2	6/29/2011	10100		1.5	0.38	U	0.38	3.2		0.66	100		0.076	0.30		0.033	1.1	B	0.98
NX-12	J1K3P3	6/29/2011	8380		1.6	0.38	U	0.38	2.7		0.66	81.8		0.076	0.24		0.033	1.0	B	0.99
SX-12	J1K3V4	7/5/2011	6320		1.4	0.34	U	0.34	1.9		0.59	76.1		0.068	0.12	B	0.029	3.0		0.87
Duplicate of J1K3V4	J1K3V5	7/5/2011	6270		1.5	0.36	U	0.36	2.1		0.62	73.7		0.072	0.12	B	0.031	2.7		0.92
SX-1	J1K3T3	7/5/2011	6010		1.4	0.34	U	0.34	2.4		0.60	50.3		0.069	0.097	B	0.030	1.9		0.88
SX-2	J1K3T4	7/5/2011	6900		1.5	0.36	U	0.36	2.7		0.62	80.6		0.072	0.13	B	0.031	3.6		0.93
SX-3	J1K3T5	7/5/2011	6500		1.5	0.37	U	0.37	2.4		0.65	58.2		0.075	0.12	B	0.032	2.2		0.96
SX-4	J1K3T6	7/5/2011	6780		1.5	0.37	U	0.37	2.3		0.64	69.8		0.074	0.12	B	0.032	2.9		0.95
SX-5	J1K3T7	7/5/2011	7220		1.4	0.34	U	0.34	2.3		0.58	69.2		0.067	0.15	B	0.029	3.0		0.87
SX-6	J1K3T8	7/5/2011	6750		1.3	0.33	U	0.33	1.9		0.57	120		0.066	0.12	B	0.029	7.3		0.85
SX-7	J1K3T9	7/5/2011	6620		1.3	0.32	U	0.32	1.9		0.56	74.1		0.064	0.12	B	0.028	3.0		0.83
SX-8	J1K3V0	7/5/2011	6610		1.3	0.32	U	0.32	5.4		0.56	50.0		0.064	0.12	B	0.028	1.4	B	0.83
SX-9	J1K3V1	7/5/2011	7920		1.5	0.37	U	0.37	3.1		0.65	116		0.075	0.21		0.032	6.6		0.96
SX-10	J1K3V2	7/5/2011	7320		1.5	0.36	U	0.36	2.5		0.62	67.2		0.072	0.15	B	0.031	2.2		0.93
SX-11	J1K3V3	7/5/2011	5960		1.4	0.35	U	0.35	1.5		0.60	41.0		0.070	0.093	B	0.030	0.90	U	0.90
SPA-1	J1K3R4	6/29/2011	9610		1.5	0.36	UJ	0.36	3.6		0.63	122		0.072	0.32		0.031	2.8		0.93
Duplicate of J1K3R4	J1K3T0	6/29/2011	8490		1.5	0.36	UJ	0.36	3.3		0.62	138		0.072	0.30		0.031	4.1		0.92
SPA-8	J1K3V7	7/5/2011	7150		1.3	0.32	U	0.32	3.9		0.56	77.3		0.065	0.23		0.028	2.2		0.84
Duplicate of J1K3V7	J1K3W4	7/5/2011	7310		1.6	0.39	U	0.39	2.4		0.67	146		0.077	0.28		0.034	6.8		0.99
SPA-2	J1K3R5	6/29/2011	6730		1.4	0.34	UJ	0.34	2.5		0.59	71.3		0.068	0.21		0.029	1.7	B	0.87
SPA-3	J1K3R6	6/29/2011	7800		1.4	0.33	UJ	0.33	3.0		0.58	127		0.066	0.28		0.029	4.1		0.86
SPA-4	J1K3R7	6/29/2011	8320		1.5	0.36	UJ	0.36	3.5		0.62	126		0.072	0.29		0.031	4.1		0.92
SPA-5	J1K3R8	6/29/2011	9480		1.5	0.37	UJ	0.37	3.7		0.64	128		0.074	0.32		0.032	3.1		0.96
SPA-6	J1K3R9	6/29/2011	9210		1.6	0.38	UJ	0.38	3.6		0.66	123		0.076	0.31		0.033	3.1		0.99
SPA-7	J1K3V6	7/5/2011	8110		1.4	0.34	U	0.34	3.6		0.59	157		0.068	0.29		0.029	8.3		0.88
SPA-9	J1K3V8	7/5/2011	9410		1.4	0.34	U	0.34	2.8		0.59	97.0		0.068	0.31		0.030	2.1		0.88
SPA-10	J1K3V9	7/5/2011	7280		1.4	0.35	U	0.35	2.6		0.60	79.7		0.069	0.25		0.030	2.6		0.89
SPA-11	J1K3W0	7/5/2011	7620		1.5	0.36	U	0.36	3.4		0.63	72.7		0.072	0.24		0.031	1.8	B	0.93
SPA-12	J1K3W1	7/5/2011	10300		1.6	0.38	U	0.38	2.6		0.66	99.0		0.076	0.33		0.033	2.0		0.98
SPA-13	J1K3W2	7/5/2011	6350		1.4	0.34	U	0.34	2.5		0.58	63.9		0.067	0.19		0.029	2.2		0.87
SPA-14	J1K3W3	7/5/2011	6220		1.6	0.40	U	0.40	2.0		0.69	88.8		0.079	0.20	B	0.034	4.5		1.0
FS-1	J1KPJ9	8/16/2011	7360		1.6	0.66		0.39	3.0		0.67	48.6		0.077	0.038	B	0.034	1.2	B	1.0
Equipment Blank 1	J1K3P5	6/29/2011	167		1.4	0.33	U	0.33	0.58	U	0.58	2.2		0.067	0.032	B	0.029	0.86	U	0.86
Equipment Blank 2	J1K3W5	7/5/2011	193		1.3	0.32	U	0.32	0.56	U	0.56	2.3		0.064	0.030	B	0.028	0.83	U	0.83

[a] Due to RAG exceedances and further excavation, re-samples were taken.

Gray cell indicates not applicable or data will not be used for closeout and is presented for information only.

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

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

B = blank contamination (organic constituents) = Estimated (inorganic)

HEIS = Hanford Environmental Information System

C = Blank contamination where sample concentration is </= 5x the blank concentration (inorganic)

J = estimate (organic) = blank contamination (inorganic)

K= Benzo(b&k)fluoranthene are unresolved due to matrix, result is reported as benzo(b)fluoranthene.

L = dilution indicating physical and chemical interference are present.

M = Sample duplicate precision not met

N = recovery is outside control limits

P = greater than 25% difference between column analyses

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyl

PQL = practical quantitation limit

Q = qualifier

R = rejected

SVOA = semivolatile

T = spike and/or spike duplicate recovery is outside control limits.

U = undetected

X = > 40% difference between the primary and confirmation detector results

Attachment	1	Sheet No.	1 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Metals)

Sample Location	HEIS Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
NX-9	J1K3P0	6/29/2011	0.12	B	0.039	4690		13.4	11.3		0.055	6.5	X	0.095	13.8		0.21	0.155	U	0.155
Duplicate of J1K3P0	J1K3P4	6/29/2011	0.14	B	0.038	4730		13.1	11.3		0.054	6.5	X	0.093	14.5		0.20	0.155	U	0.155
NX-1	J1K3N2	6/29/2011	0.17	B	0.037	3760		12.7	11.8		0.052	6.2	X	0.090	16.6		0.20	0.155	U	0.155
NX-2	J1K3N3	6/29/2011	0.11	B	0.037	3930		12.8	11.3		0.053	6.8	X	0.091	15.6		0.20	0.155	U	0.155
NX-3	J1K3N4	6/29/2011	0.078	B	0.041	3920		14.1	11.2		0.058	7.0	X	0.10	14.0		0.22	0.155	U	0.155
NX-4	J1K3N5	6/29/2011	0.16	B	0.038	4500		13.0	13.0		0.053	6.8	X	0.092	17.1		0.20	0.155	U	0.155
NX-5	J1K3N6	6/29/2011	0.089	B	0.040	4780		13.9	11.7		0.057	6.7	X	0.099	18.3		0.21	0.155	U	0.155
NX-6	J1K3N7	6/29/2011	0.11	B	0.040	3770		13.6	9.6		0.056	5.7	X	0.097	13.9		0.21	0.155	U	0.155
NX-7	J1K3N8	6/29/2011	0.16	B	0.041	4890		14.1	13.8		0.058	6.9	X	0.10	18.5		0.22	0.155	U	0.155
NX-8	J1K3N9	6/29/2011	0.084	B	0.040	4310		13.9	12.0		0.057	7.2	X	0.099	15.8		0.21	0.155	U	0.155
NX-10	J1K3P1	6/29/2011	0.11	B	0.039	4600		13.4	11.4		0.055	6.6	X	0.095	19.0		0.21	0.155	U	0.155
NX-11	J1K3P2	6/29/2011	0.097	B	0.041	3580		14.0	11.6		0.058	7.4	X	0.10	13.7		0.22	0.155	U	0.155
NX-12	J1K3P3	6/29/2011	0.090	B	0.041	3800		14.2	13.0		0.058	6.4	X	0.10	13.8		0.22	0.155	U	0.155
SX-12	J1K3V4	7/5/2011	0.049	B	0.037	4820		12.6	10		0.052	6.0	X	0.089	11.9		0.19	0.155	U	0.155
Duplicate of J1K3V4	J1K3V5	7/5/2011	0.077	B	0.039	5220		13.3	9.2		0.055	5.9	X	0.094	11.7		0.20	0.155	U	0.155
SX-1	J1K3T3	7/5/2011	0.059	B	0.037	5340		12.7	10.2		0.052	6.0	X	0.090	12.4		0.20	0.155	U	0.155
SX-2	J1K3T4	7/5/2011	0.080	B	0.039	5570		13.3	13.4		0.055	6.5	X	0.095	14.3		0.21	0.155	U	0.155
SX-3	J1K3T5	7/5/2011	0.078	B	0.040	6330		13.8	10.9		0.057	6.0	X	0.098	12.5		0.21	0.155	U	0.155
SX-4	J1K3T6	7/5/2011	0.079	B	0.040	5250		13.7	9.5		0.056	6.4	X	0.097	11.8		0.21	0.155	U	0.155
SX-5	J1K3T7	7/5/2011	0.16	B	0.036	5280		12.5	10.1		0.051	6.4	X	0.089	13.4		0.19	0.155	U	0.155
SX-6	J1K3T8	7/5/2011	0.079	B	0.035	6710		12.2	10.1		0.050	5.5	X	0.086	11.9		0.19	0.155	U	0.155
SX-7	J1K3T9	7/5/2011	0.077	B	0.035	5740		11.9	9.2		0.049	6.3	X	0.085	12.8		0.18	0.155	U	0.155
SX-8	J1K3V0	7/5/2011	0.075	B	0.035	5720		11.9	11.5		0.049	5.9	X	0.084	13.2		0.18	0.155	U	0.155
SX-9	J1K3V1	7/5/2011	0.11	B	0.040	5700		13.9	12.7		0.057	6.8	X	0.098	14.9		0.21	0.155	U	0.155
SX-10	J1K3V2	7/5/2011	0.083	B	0.039	5380		13.3	11.8		0.055	6.3	X	0.095	13.6		0.21	0.155	U	0.155
SX-11	J1K3V3	7/5/2011	0.065	B	0.038	6550		12.9	11.1		0.053	6.5	X	0.092	11.9		0.20	0.155	U	0.155
SPA-1	J1K3R4	6/29/2011	0.21		0.039	4740		13.4	16.3		0.055	6.8	X	0.095	17.5		0.21	0.155	UJ	0.155
Duplicate of J1K3R4	J1K3T0	6/29/2011	0.20		0.039	4950		13.3	13.4		0.055	6.2	X	0.094	16.9		0.20	0.749	J	0.155
SPA-8	J1K3V7	7/5/2011	0.093	B	0.035	4730		12.1	10.2		0.050	5.7	X	0.085	12.0		0.19	0.155	U	0.155
Duplicate of J1K3V7	J1K3W4	7/5/2011	0.081	B	0.042	5110		14.3	8.9		0.059	6.4	X	0.10	13.4		0.22	0.155	U	0.155
SPA-2	J1K3R5	6/29/2011	0.082	B	0.036	4340		12.5	10.4		0.052	5.3	X	0.089	12.2		0.19	0.155	UJ	0.155
SPA-3	J1K3R6	6/29/2011	0.15	B	0.036	5340		12.3	10.9		0.051	5.9	X	0.087	16.1		0.19	0.155	UJ	0.155
SPA-4	J1K3R7	6/29/2011	0.17	B	0.039	5210		13.3	12.3		0.055	6.2	X	0.094	16.1		0.20	0.357	J	0.155
SPA-5	J1K3R8	6/29/2011	0.27		0.040	5220		13.8	16.9		0.057	6.8	X	0.098	18.1		0.21	0.155	UJ	0.155
SPA-6	J1K3R9	6/29/2011	0.26		0.041	5120		14.2	16.0		0.058	6.7	X	0.10	18.2		0.22	0.155	UJ	0.155
SPA-7	J1K3V6	7/5/2011	0.083	B	0.037	5960		12.6	11.0		0.052	6.0	X	0.089	14.3		0.19	0.155	U	0.155
SPA-9	J1K3V8	7/5/2011	0.074	B	0.037	4070		12.6	10.8		0.052	7.0	X	0.089	13.3		0.19	0.155	U	0.155
SPA-10	J1K3V9	7/5/2011	0.074	B	0.037	4570		12.8	10.0		0.053	6.2	X	0.091	14.2		0.20	0.155	U	0.155
SPA-11	J1K3W0	7/5/2011	0.088	B	0.039	3470		13.4	9.5		0.055	6.3	X	0.095	11.3		0.21	0.155	U	0.155
SPA-12	J1K3W1	7/5/2011	0.083	B	0.041	3570		14.1	11.4		0.058	7.3	X	0.10	13.2		0.22	0.155	U	0.155
SPA-13	J1K3W2	7/5/2011	0.079	B	0.036	4040		12.5	10.3		0.051	5.5	X	0.089	11.1		0.19	0.155	U	0.155
SPA-14	J1K3W3	7/5/2011	0.066	B	0.043	4680		14.7	9.0		0.061	5.5	X	0.10	11.2		0.23	0.155	U	0.155
FS-1	J1KPJ9	8/16/2011	0.076	B	0.042	6550		14.3	10.8		0.059	5.9		0.10	13.0		0.22	0.155	U	0.155
Equipment Blank 1	J1K3P5	6/29/2011	0.036	U	0.036	35.8	B	12.4	0.15	B	0.051	0.10	BX	0.088	0.19	U	0.19			
Equipment Blank 2	J1K3W5	7/5/2011	0.035	U	0.035	43.7		11.9	0.12	B	0.049	0.10	BX	0.085	0.18	U	0.18			

Attachment	1	Sheet No.	2 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Metals)

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
NX-9	J1K3P0	6/29/2011	18100		3.6	7.5		0.26	4140		3.5	312		0.095	0.020		0.0051	0.25	U	0.25
Duplicate of J1K3P0	J1K3P4	6/29/2011	17400		3.5	7.6		0.25	4120		3.4	297		0.093	0.024		0.0050	0.24	U	0.24
NX-1	J1K3N2	6/29/2011	17300		3.4	7.8		0.24	4060		3.3	298		0.090	0.026	M	0.0054	0.23	U	0.23
NX-2	J1K3N3	6/29/2011	18400		3.5	6.8		0.25	4240		3.4	316		0.091	0.019		0.0050	0.24	U	0.24
NX-3	J1K3N4	6/29/2011	19200		3.8	9.0		0.27	4150		3.7	337		0.10	0.011	B	0.0055	0.26	U	0.26
NX-4	J1K3N5	6/29/2011	18500		3.5	136		0.25	4480		3.4	318		0.092	0.039		0.0053	0.24	U	0.24
NX-5	J1K3N6	6/29/2011	17500		3.7	6.4		0.27	4100		3.6	297		0.099	0.017		0.0050	0.26	U	0.26
NX-6	J1K3N7	6/29/2011	15300		3.7	7.2		0.26	3640		3.6	255		0.097	0.022		0.0049	0.25	U	0.25
NX-7	J1K3N8	6/29/2011	18400		3.8	12.6		0.27	4890		3.7	319		0.10	0.026		0.0051	0.26	B	0.26
NX-8	J1K3N9	6/29/2011	19500		3.7	6.8		0.27	4550		3.7	328		0.099	0.012	B	0.0050	0.26	U	0.26
NX-10	J1K3P1	6/29/2011	18300		3.6	9.5		0.26	4240		3.5	300		0.095	0.021		0.0056	0.25	U	0.25
NX-11	J1K3P2	6/29/2011	20100		3.8	5.6		0.27	4210		3.7	360		0.10	0.0095	B	0.0049	0.26	U	0.26
NX-12	J1K3P3	6/29/2011	18000		3.8	5.5		0.27	3970		3.7	303		0.10	0.024		0.0051	0.26	U	0.26
SX-12	J1K3V4	7/5/2011	14700		3.4	4.6		0.24	4170		3.3	233		0.089	1.8		0.027	0.23	U	0.23
Duplicate of J1K3V4	J1K3V5	7/5/2011	14500		3.6	4.8		0.25	3980		3.5	233		0.094	1.5		0.027	0.24	U	0.24
SX-1	J1K3T3	7/5/2011	15100		3.4	4.2		0.24	4080		3.3	242		0.090	0.79		0.025	0.23	U	0.23
SX-2	J1K3T4	7/5/2011	15800		3.6	5.8		0.26	4530		3.5	246		0.095	4.2		0.11	0.25	U	0.25
SX-3	J1K3T5	7/5/2011	15100		3.7	5.9		0.26	4080		3.6	240		0.098	2.4	M	0.11	0.25	U	0.25
SX-4	J1K3T6	7/5/2011	15900		3.7	6.1		0.26	4130		3.6	267		0.097	0.13		0.0055	0.25	U	0.25
SX-5	J1K3T7	7/5/2011	16000		3.4	5.1		0.24	4100		3.3	261		0.089	15.8		0.53	0.23	U	0.23
SX-6	J1K3T8	7/5/2011	14500		3.3	3.4		0.23	4430		3.2	244		0.086	0.18		0.0054	0.22	U	0.22
SX-7	J1K3T9	7/5/2011	16000		3.2	4.6		0.23	4270		3.1	251		0.085	0.15		0.0050	0.22	U	0.22
SX-8	J1K3V0	7/5/2011	15200		3.2	3.9		0.23	4300		3.1	257		0.084	1.1		0.024	0.22	U	0.22
SX-9	J1K3V1	7/5/2011	17000		3.7	6.5		0.27	4510		3.6	267		0.098	0.12		0.0055	0.26	U	0.26
SX-10	J1K3V2	7/5/2011	16300		3.6	6.0		0.26	4120		3.5	262		0.095	0.10		0.0050	0.25	U	0.25
SX-11	J1K3V3	7/5/2011	14000		3.5	2.9		0.25	4260		3.4	223		0.092	0.083		0.0050	0.25	B	0.24
SPA-1	J1K3R4	6/29/2011	18100		3.6	13.4	X	0.26	4990		3.5	324		0.095	0.033	N	0.0048	0.36	B	0.25
Duplicate of J1K3R4	J1K3T0	6/29/2011	16400		3.6	12.2	X	0.25	4480		3.5	303		0.094	0.026		0.0054	0.35	B	0.24
SPA-8	J1K3V7	7/5/2011	14900		3.2	5.6		0.23	4020		3.2	253		0.085	0.53		0.0049	0.22	U	0.22
Duplicate of J1K3V7	J1K3W4	7/5/2011	16400		3.9	5.0		0.27	4150		3.8	265		0.10	0.42		0.0058	0.26	U	0.26
SPA-2	J1K3R5	6/29/2011	14200		3.4	6.6	X	0.24	3840		3.3	250		0.089	0.027		0.0050	0.39	B	0.23
SPA-3	J1K3R6	6/29/2011	15400		3.3	8.1	X	0.24	4170		3.2	276		0.087	0.020		0.0054	0.38	B	0.23
SPA-4	J1K3R7	6/29/2011	16500		3.6	17.1	X	0.25	4440		3.5	298		0.094	0.017		0.0054	0.27	B	0.24
SPA-5	J1K3R8	6/29/2011	17600		3.7	16.3	X	0.26	5520		3.6	330		0.098	0.032		0.0051	0.25	U	0.25
SPA-6	J1K3R9	6/29/2011	17500		3.8	19.5	X	0.27	5070		3.7	320		0.10	0.033		0.0054	0.26	U	0.26
SPA-7	J1K3V6	7/5/2011	15200		3.4	8.5		0.24	4250		3.3	269		0.089	0.69	N	0.026	0.30	B	0.23
SPA-9	J1K3V8	7/5/2011	18100		3.4	5.9		0.24	4400		3.3	319		0.089	0.013	B	0.0049	0.23	U	0.23
SPA-10	J1K3V9	7/5/2011	15500		3.5	5.0		0.25	3970		3.4	255		0.091	0.034		0.0054	0.32	B	0.24
SPA-11	J1K3W0	7/5/2011	16800		3.6	5.1		0.26	3850		3.5	279		0.095	0.0053	U	0.0053	0.25	U	0.25
SPA-12	J1K3W1	7/5/2011	18900		3.8	5.3		0.27	4370		3.7	340		0.10	0.0050	U	0.0050	0.26	U	0.26
SPA-13	J1K3W2	7/5/2011	14600		3.4	4.6		0.24	3860		3.3	237		0.089	0.59		0.0052	0.23	U	0.23
SPA-14	J1K3W3	7/5/2011	14100		4.0	4.4		0.28	3690		3.9	239		0.10	0.019	B	0.0065	0.27	U	0.27
FS-1	J1KPJ9	8/16/2011	17400		3.9	4.7		0.27	4140		3.8	286		0.10	0.0055	U	0.0055	0.26	U	0.26
Equipment Blank 1	J1K3P5	6/29/2011	252		3.3	0.40	B	0.24	21.4		3.2	5.5		0.088	0.0054	U	0.0054	0.23	U	0.23
Equipment Blank 2	J1K3W5	7/5/2011	255		3.2	0.71		0.23	23.4		3.1	5.6		0.085	0.0054	U	0.0054	0.22	U	0.22

Attachment	1	Sheet No.	3 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Metals)

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
NX-9	J1K3P0	6/29/2011	11.5	X	0.12	1600		39.0	0.82	U	0.82	226		5.4	0.15	U	0.15	204		56.1
Duplicate of J1K3P0	J1K3P4	6/29/2011	11.1	X	0.11	1610		38.2	0.80	U	0.80	228		5.3	0.15	U	0.15	232		55.0
NX-1	J1K3N2	6/29/2011	11.4	X	0.11	1600		36.9	0.77	U	0.77	278		5.1	0.14	U	0.14	208		53.1
NX-2	J1K3N3	6/29/2011	11.3	X	0.11	1570		37.3	0.78	U	0.78	236		5.1	0.15	U	0.15	216		53.7
NX-3	J1K3N4	6/29/2011	11.0	X	0.12	1560		41.0	0.86	U	0.86	341		5.7	0.16	U	0.16	224		59.0
NX-4	J1K3N5	6/29/2011	12.6	X	0.11	1540		37.7	0.79	U	0.79	239		5.2	0.15	U	0.15	262		54.3
NX-5	J1K3N6	6/29/2011	11.4	X	0.12	1520		40.4	0.85	U	0.85	306		5.6	0.16	U	0.16	237		58.2
NX-6	J1K3N7	6/29/2011	11.1	X	0.12	1370		39.7	0.83	U	0.83	288		5.5	0.15	U	0.15	203		57.1
NX-7	J1K3N8	6/29/2011	13.3	X	0.12	1580		40.9	0.86	U	0.86	272		5.6	0.16	U	0.16	248		58.9
NX-8	J1K3N9	6/29/2011	11.9	X	0.12	1540		40.5	0.85	U	0.85	261		5.6	0.16	U	0.16	224		58.2
NX-10	J1K3P1	6/29/2011	12.1	X	0.12	1540		38.9	0.82	U	0.82	222		5.4	0.15	U	0.15	210		55.9
NX-11	J1K3P2	6/29/2011	11.1	X	0.12	1950		40.8	0.86	U	0.86	305		5.6	0.16	U	0.16	247		58.7
NX-12	J1K3P3	6/29/2011	11.0	X	0.12	1620		41.2	0.86	U	0.86	309		5.7	0.16	U	0.16	195		59.3
SX-12	J1K3V4	7/5/2011	10.5		0.11	860		36.5	0.77	U	0.77	382	X	5.0	0.14	U	0.14	242		52.6
Duplicate of J1K3V4	J1K3V5	7/5/2011	10.3		0.12	904		38.6	0.81	U	0.81	323	X	5.3	0.15	U	0.15	219		55.5
SX-1	J1K3T3	7/5/2011	11.3		0.11	878		37.0	0.78	U	0.78	290	X	5.1	0.14	U	0.14	212		53.2
SX-2	J1K3T4	7/5/2011	17.1		0.12	1100		38.8	0.81	U	0.81	314	X	5.4	0.15	U	0.15	243		55.8
SX-3	J1K3T5	7/5/2011	10.2		0.12	882		40.2	0.84	U	0.84	424	X	5.5	0.16	U	0.16	220		57.8
SX-4	J1K3T6	7/5/2011	10.9		0.12	1160		39.9	0.84	U	0.84	355	X	5.5	0.16	U	0.16	232		57.4
SX-5	J1K3T7	7/5/2011	10.5		0.11	1120		36.3	0.76	U	0.76	384	X	5.0	0.14	U	0.14	225		52.2
SX-6	J1K3T8	7/5/2011	11.1		0.11	897		35.4	0.74	U	0.74	260	X	4.9	0.14	U	0.14	429		51.0
SX-7	J1K3T9	7/5/2011	10.7		0.10	934		34.7	0.73	U	0.73	328	X	4.8	0.14	U	0.14	238		50.0
SX-8	J1K3V0	7/5/2011	11.6		0.10	863		34.5	0.72	U	0.72	277	X	4.8	0.13	U	0.13	208		49.7
SX-9	J1K3V1	7/5/2011	12.8		0.12	1230		40.4	0.85	U	0.85	338	X	5.6	0.16	U	0.16	290		58.1
SX-10	J1K3V2	7/5/2011	11.0		0.12	1180		38.8	0.81	U	0.81	412	X	5.4	0.15	U	0.15	236		55.8
SX-11	J1K3V3	7/5/2011	12.6		0.11	782		37.6	0.79	U	0.79	217	X	5.2	0.15	U	0.15	205		54.0
SPA-1	J1K3R4	6/29/2011	14.5	X	0.12	1760		39.0	0.82	U	0.82	310	XNJ	5.4	0.15	U	0.15	242		56.1
Duplicate of J1K3R4	J1K3T0	6/29/2011	12.4	X	0.12	1500		38.6	0.81	U	0.81	235	XJ	5.3	0.15	U	0.15	253		55.5
SPA-8	J1K3V7	7/5/2011	10.9		0.11	1320		35.0	0.74	U	0.74	248		4.8	0.14	U	0.14	241		50.4
Duplicate of J1K3V7	J1K3W4	7/5/2011	10.6		0.12	1330		41.6	0.87	U	0.87	329		5.7	0.16	U	0.16	331		59.9
SPA-2	J1K3R5	6/29/2011	10.0	X	0.11	1170		36.4	0.76	U	0.76	219	XJ	5.0	0.14	U	0.14	199		52.4
SPA-3	J1K3R6	6/29/2011	10.9	X	0.11	1500		35.8	0.75	U	0.75	248	XJ	4.9	0.14	U	0.14	241		51.6
SPA-4	J1K3R7	6/29/2011	12.2	X	0.12	1610		38.6	0.81	U	0.81	264	XJ	5.3	0.15	U	0.15	257		55.5
SPA-5	J1K3R8	6/29/2011	15.0	X	0.12	1720		40.0	0.84	U	0.84	269	XJ	5.5	0.97		0.16	220		57.6
SPA-6	J1K3R9	6/29/2011	13.9	X	0.12	1930		41.2	0.86	U	0.86	249	XJ	5.7	0.16	U	0.16	231		59.3
SPA-7	J1K3V6	7/5/2011	11.7		0.11	1510		36.6	0.77	U	0.77	259	N	5.1	0.14	U	0.14	332		52.7
SPA-9	J1K3V8	7/5/2011	11.2		0.11	1620		36.7	0.77	U	0.77	386		5.1	0.14	U	0.14	263		52.8
SPA-10	J1K3V9	7/5/2011	10.1		0.11	1160		37.3	0.78	U	0.78	244		5.1	0.15	U	0.15	247		53.7
SPA-11	J1K3W0	7/5/2011	9.8		0.12	1650		39.0	0.82	U	0.82	277		5.4	0.15	U	0.15	298		56.2
SPA-12	J1K3W1	7/5/2011	11.2		0.12	1880		41.0	0.86	U	0.86	429		5.7	0.16	U	0.16	269		59.0
SPA-13	J1K3W2	7/5/2011	10.4		0.11	971		36.3	0.76	U	0.76	198		5.0	0.14	U	0.14	218		52.2
SPA-14	J1K3W3	7/5/2011	9.6		0.13	946		42.9	0.90	U	0.90	258		5.9	0.17	U	0.17	250		61.7
FS-1	J1KPJ9	8/16/2011	10.4		0.12	1160		41.7	0.87	U	0.87	416		5.8	0.16	U	0.16	225		59.9
Equipment Blank 1	J1K3P5	6/29/2011	0.13	BX	0.11	49.7	B	36.0	0.75	U	0.75	105		5.0	0.14	U	0.14	51.8	U	51.8
Equipment Blank 2	J1K3W5	7/5/2011	0.10	U	0.10	50.0	B	34.7	0.73	U	0.73	111		4.8	0.14	U	0.14	50.0	U	50.0

Attachment	1	Sheet No.	4 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Metals, TPH and Physical)

Sample Location	HEIS Number	Sample Date	Vanadium			Zinc			Percent moisture		
			mg/kg	Q	PQL	%	Q	PQL	%	Q	PQL
NX-9	J1K3P0	6/29/2011	42.5		0.089	52.9		0.38	0.78		0.10
Duplicate of J1K3P0	J1K3P4	6/29/2011	41.2		0.088	50.7		0.37	0.61		0.10
NX-1	J1K3N2	6/29/2011	38.3		0.085	49.9		0.36	1.6		0.10
NX-2	J1K3N3	6/29/2011	42.6		0.085	45.7		0.36	0.93		0.10
NX-3	J1K3N4	6/29/2011	43.7		0.094	39.3		0.40	0.95		0.10
NX-4	J1K3N5	6/29/2011	42.1		0.086	52.9		0.37	1.2		0.10
NX-5	J1K3N6	6/29/2011	41.3		0.093	41.6		0.39	0.56		0.10
NX-6	J1K3N7	6/29/2011	35.2		0.091	47.2		0.38	0.52		0.10
NX-7	J1K3N8	6/29/2011	40.9		0.094	64.7		0.40	4.2		0.10
NX-8	J1K3N9	6/29/2011	45.3		0.093	43.7		0.39	0.53		0.10
NX-10	J1K3P1	6/29/2011	42.3		0.089	64.0		0.38	0.48		0.10
NX-11	J1K3P2	6/29/2011	43.3		0.094	49.6		0.40	0.51		0.10
NX-12	J1K3P3	6/29/2011	40.4		0.094	41.6		0.40	0.51		0.10
SX-12	J1K3V4	7/5/2011	36.8		0.084	33.7		0.35	0.70		0.10
Duplicate of J1K3V4	J1K3V5	7/5/2011	35.8		0.088	34.8		0.37	0.68		0.10
SX-1	J1K3T3	7/5/2011	39.1		0.085	34.5		0.36	1.0		0.10
SX-2	J1K3T4	7/5/2011	38.3		0.089	37.1		0.38	3.0		0.10
SX-3	J1K3T5	7/5/2011	39.0		0.092	37.3		0.39	0.98		0.10
SX-4	J1K3T6	7/5/2011	39.5		0.091	36.2		0.39	0.13		0.10
SX-5	J1K3T7	7/5/2011	39.0		0.083	84.1		0.35	1.8		0.10
SX-6	J1K3T8	7/5/2011	36.5		0.081	35.5		0.34	0.20		0.10
SX-7	J1K3T9	7/5/2011	40.9		0.080	37.9		0.34	0.10	U	0.10
SX-8	J1K3V0	7/5/2011	37.7		0.079	33.2		0.34	0.25		0.10
SX-9	J1K3V1	7/5/2011	40.3		0.093	59.3		0.39	0.40		0.10
SX-10	J1K3V2	7/5/2011	38.3		0.089	38.3		0.38	0.20		0.10
SX-11	J1K3V3	7/5/2011	35.9		0.086	29.9		0.36	0.76		0.10
SPA-1	J1K3R4	6/29/2011	38.5		0.089	63.4	X	0.38	0.77		0.10
Duplicate of J1K3R4	J1K3T0	6/29/2011	37.7		0.088	57.8	X	0.37	0.71		0.10
SPA-8	J1K3V7	7/5/2011	38.2		0.080	32.8		0.34	0.10	U	0.10
Duplicate of J1K3V7	J1K3W4	7/5/2011	42.6		0.095	36.9		0.40	11.3		0.10
SPA-2	J1K3R5	6/29/2011	32.3		0.084	38.9	X	0.35	0.41		0.10
SPA-3	J1K3R6	6/29/2011	37.4		0.082	49.6	X	0.35	0.50		0.10
SPA-4	J1K3R7	6/29/2011	38.2		0.088	50.8	X	0.37	0.71		0.10
SPA-5	J1K3R8	6/29/2011	37.0		0.092	74.8	X	0.39	0.60		0.10
SPA-6	J1K3R9	6/29/2011	37.1		0.095	73.0	X	0.40	0.57		0.10
SPA-7	J1K3V6	7/5/2011	39.1		0.084	33.2		0.36	0.10	U	0.10
SPA-9	J1K3V8	7/5/2011	42.3		0.084	37.8		0.36	0.18		0.10
SPA-10	J1K3V9	7/5/2011	39.6		0.086	34.5		0.36	0.10	U	0.10
SPA-11	J1K3W0	7/5/2011	41.5		0.090	35.8		0.38	0.10	U	0.10
SPA-12	J1K3W1	7/5/2011	42.1		0.094	39.0		0.40	0.10	U	0.10
SPA-13	J1K3W2	7/5/2011	40.1		0.083	29.8		0.35	0.10	U	0.10
SPA-14	J1K3W3	7/5/2011	38.9		0.098	30.6		0.42	16.8		0.10
FS-1	J1KPJ9	8/16/2011	42.0		0.096	34.5		0.40	3.5		0.10
Equipment Blank 1	J1K3P5	6/29/2011	0.25	B	0.083	1.0		0.35	0.10	U	0.10
Equipment Blank 2	J1K3W5	7/5/2011	0.34	B	0.080	1.0	C	0.34	0.10	U	0.10

Attachment	1	Sheet No.	5 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Rad)

Sample Location	HEIS Number	Sample Date	Americium-241			Cesium-137			Cobalt-60			Europium-152			Europium-154			Europium-155		
			pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL
SX-12	J1K3V4	7/5/2011	0.0714	U	0.164	0.00699	U	0.0248	-0.00306	U	0.0255	0.0155	U	0.0607	0.00483	U	0.0847	0.0552	U	0.0713
Duplicate of J1K3V4	J1K3V5	7/5/2011	0.0277	U	0.0564	0.00521	U	0.0328	0.00259	U	0.0341	0.00524	U	0.0816	-0.00780	U	0.0993	0.0164	U	0.0751
SX-1	J1K3T3	7/5/2011	-0.310	U	0.274	0.0140	U	0.0343	0.00324	U	0.0350	0.0271	U	0.0861	-0.0277	U	0.110	0.0272	U	0.0991
SX-2	J1K3T4	7/5/2011	-0.0277	U	0.151	0.0509		0.0243	0.000946	U	0.0248	0.144	U	0.0734	0.0124	U	0.0797	0.0684	U	0.0682
SX-3	J1K3T5	7/5/2011	0.0285	U	0.0563	0.0338	U	0.0356	0.00240	U	0.0330	0.0797	U	0.0890	-0.0345	U	0.0964	0.0538	U	0.0801
SX-4	J1K3T6	7/5/2011	0.0842	U	0.288	0.0156	U	0.0316	0.00251	U	0.0315	0.00473	U	0.0766	-0.0539	U	0.0942	0.0436	U	0.0939
SX-5	J1K3T7	7/5/2011	-0.0275	U	0.0689	0.0191	U	0.0382	0.00776	U	0.0381	0.00301	U	0.100	-0.0483	U	0.116	0.0520	U	0.0987
SX-6	J1K3T8	7/5/2011	-0.0361	U	0.154	0.00609	U	0.0246	0.00338	U	0.0248	0.0114	U	0.0612	-0.0275	U	0.0865	0.0134	U	0.0681
SX-7	J1K3T9	7/5/2011	-0.00287	U	0.0532	0.0138	U	0.0349	0.00545	U	0.0354	0.0363	U	0.0894	0.000789	U	0.105	0.0253	U	0.0766
SX-8	J1K3V0	7/5/2011	-0.0653	U	0.133	-0.0120	U	0.0292	0.0111	U	0.0313	-0.00155	U	0.0782	0.00777	U	0.107	0.0396	U	0.100
SX-9	J1K3V1	7/5/2011	0.0167	U	0.280	0.0265	U	0.0367	-0.00171	U	0.0312	0.0464	U	0.0833	-0.00000288	U	0.103	-0.0175	U	0.0953
SX-10	J1K3V2	7/5/2011	-0.00141	U	0.128	0.0102	U	0.0288	0.00512	U	0.0288	0.0987	U	0.0753	-0.0364	U	0.0910	0.0113	U	0.0952
SX-11	J1K3V3	7/5/2011	-0.0187	U	0.0719	-0.00233	U	0.0395	0.00778	U	0.0379	0.0657	U	0.108	0.0136	U	0.133	-0.0531	U	0.0938

Sample Location	HEIS Number	Sample Date	Americium-241			Cesium-137			Cobalt-60			Europium-152			Europium-154			Europium-155		
			pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL	pCi/g	Q	PQL
SPA-1	J1K3R4	6/29/2011	-0.0125	U	0.0661	0.108		0.0398	0.0190	U	0.0375	0.0453	U	0.104	0.0210	U	0.111	0.0794	U	0.0966
Duplicate of J1K3R4	J1K3T0	6/29/2011	0.0341	U	0.186	0.0469	U	0.0364	0.000319	U	0.0290	0.0529	U	0.0763	-0.0183	U	0.0961	0.0676	U	0.0830
SPA-8	J1K3V7	7/5/2011	-0.0936	U	0.287	-0.00174	U	0.0322	0.00230	U	0.0335	0.0134	U	0.0820	0.0258	U	0.103	-0.00905	U	0.0971
Duplicate of J1K3V7	J1K3W4	7/5/2011	-0.0668	U	0.125	0.0152	U	0.0302	0.00266	U	0.0285	0.0869	U	0.0803	0.0170	U	0.0874	0.0383	U	0.0963
SPA-2	J1K3R5	6/29/2011	-0.000461	U	0.156	0.0280	U	0.0285	-0.0143	U	0.0234	0.0144	U	0.0594	0.0203	U	0.0883	0.0806	U	0.0746
SPA-3	J1K3R6	6/29/2011	-0.0251	U	0.130	0.0305	U	0.0435	0.00111	U	0.0383	0.0240	U	0.0969	0.0266	U	0.128	0.0589	U	0.0975
SPA-4	J1K3R7	6/29/2011	0.0297	U	0.155	0.00372	U	0.0338	0.0154	U	0.0352	0.0876	U	0.0937	-0.0431	U	0.101	0.0170	U	0.113
SPA-5	J1K3R8	6/29/2011	-0.0169	U	0.336	0.137		0.0398	-0.000360	U	0.0413	0.212	U	0.118	0.000176	U	0.132	0.0442	U	0.114
SPA-6	J1K3R9	6/29/2011	0.0370	U	0.083	0.112		0.0409	0.00977	U	0.0460	0.137	U	0.128	0.00351	U	0.132	0.0141	U	0.117
SPA-7	J1K3V6	7/5/2011	0.0192	U	0.0560	0.00451	U	0.0332	0.00972	U	0.0352	0.0397	U	0.0877	-0.0536	U	0.102	0.0282	U	0.0776
SPA-9	J1K3V8	7/5/2011	-0.0851	U	0.146	0.00620	U	0.0335	-0.00523	U	0.0298	0.0389	U	0.0867	0.00808	U	0.101	-0.0332	U	0.105
SPA-10	J1K3V9	8/23/2011	-0.0198	U	0.0641	-0.00352	U	0.0357	0.00301	U	0.0321	0.0151	U	0.0889	-0.0364	U	0.110	0.0413	U	0.0885
SPA-11	J1K3W0	7/5/2011	-0.00377	U	0.0560	0.00954	U	0.0332	-0.00548	U	0.0337	-0.000169	U	0.0838	0.00778	U	0.102	0.0469	U	0.0762
SPA-12	J1K3W1	7/5/2011	-0.0237	U	0.0639	-0.0106	U	0.0371	-0.00613	U	0.0375	-0.0154	U	0.0931	-0.00536	U	0.120	0.0120	U	0.0885
SPA-13	J1K3W2	7/5/2011	0.0791	U	0.149	0.00449	U	0.0234	0.00737	U	0.0277	0.0338	U	0.0617	0.0000627	U	0.0820	0.0497	U	0.0654
SPA-14	J1K3W3	7/5/2011	-0.0162	U	0.0753	-0.00461	U	0.0390	0.00815	U	0.0421	-0.0306	U	0.101	0.00329	U	0.122	0.0639	U	0.107
FS-1	J1KPJ9	8/16/2011	-0.0198	U	0.0641	-0.00352	U	0.0357	0.00301	U	0.0321	0.0151	U	0.0889	-0.0364	U	0.110	0.0413	U	0.0885

Attachment	1	Sheet No.	6 of 36
Originator	N. Kobayashi	Date	10/10/11
Checked	J. D. Skoglie	Date	10/10/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-9 J1K3P0 6/29/2011			Duplicate of J1K3P0 J1K3P4 6/29/2011			NX-1 J1K3N2 6/29/2011			NX-2 J1K3N3 6/29/2011			NX-3 J1K3N4 6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.5	U	9.5	9.5	U	9.5	9.9	U	9.9	9.7	U	9.7	9.4	U	9.4
Acenaphthylene	PAH	8.6	U	8.6	27	J	8.5	8.9	U	8.9	8.7	U	8.7	8.5	U	8.5
Anthracene	PAH	2.9	U	2.9	2.9	U	2.9	9.3	JX	3.0	3.0	U	3.0	2.9	U	2.9
Benzo(a)anthracene	PAH	7.7	J	3.0	15		3.0	45	X	3.2	3.1	U	3.1	110		3.0
Benzo(a)pyrene	PAH	12	J	6.1	20		6.1	44		6.3	13	J	6.2	95		6.0
Benzo(b)fluoranthene	PAH	13	JX	4.0	35	X	4.0	37	X	4.2	12	JX	4.1	92		4.0
Benzo(ghi)perylene	PAH	6.8	U	6.8	10	J	6.8	17	JX	7.1	7.0	U	7.0	48		6.8
Benzo(k)fluoranthene	PAH	5.2	J	3.7	8.3	J	3.7	17		3.9	5.1	JX	3.8	56		3.7
Chrysene	PAH	13	J	4.6	25	J	4.6	51		4.8	17	J	4.7	97		4.6
Dibenz[a,h]anthracene	PAH	10	U	10	10	U	10	11	U	11	11	U	11	18	JX	10
Fluoranthene	PAH	15	J	12	18	JX	12	95		13	23	J	13	260		12
Fluorene	PAH	5.0	U	5.0	5.0	U	5.0	5.2	U	5.2	5.1	U	5.1	17	J	5.0
Indeno(1,2,3-cd)pyrene	PAH	11	J	11	19	J	11	29	J	12	12	U	12	63		11
Naphthalene	PAH	11	U	11	11	U	11	12	U	12	12	U	12	11	U	11
Phenanthrene	PAH	11	U	11	11	U	11	65		12	12	U	12	170		11
Pyrene	PAH	19	J	11	16	J	11	76	X	12	17	JX	12	230		11
Aroclor-1016	PCB	2.6	U	2.6	2.7	U	2.7	2.8	U	2.8	2.8	U	2.8	2.8	U	2.8
Aroclor-1221	PCB	7.5	U	7.5	7.8	U	7.8	8.1	U	8.1	8.0	U	8.0	8.1	U	8.1
Aroclor-1232	PCB	1.9	U	1.9	1.9	U	1.9	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.3	U	4.3	4.5	U	4.5	4.7	U	4.7	4.7	U	4.7	4.7	U	4.7
Aroclor-1248	PCB	4.3	U	4.3	4.5	U	4.5	4.7	U	4.7	4.7	U	4.7	4.7	U	4.7
Aroclor-1254	PCB	2.4	U	2.4	2.5	U	2.5	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6
Aroclor-1260	PCB	16	P	2.4	20	P	2.5	27	P	2.6	17	P	2.6	2.6	U	2.6
Aldrin	PEST	2.4	UD	2.4	0.24	U	0.24	2.6	UD	2.6	2.4	UD	2.4	2.5	UD	2.5
Alpha-BHC	PEST	2.0	UD	2.0	0.20	U	0.20	2.2	UD	2.2	2.1	UD	2.1	2.1	UD	2.1
alpha-Chlordane	PEST	3.0	UD	3.0	2.8		0.31	7.3	JD	3.3	3.1	UD	3.1	3.2	UD	3.2
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	6.2	UD	6.2	0.63	U	0.63	6.7	UD	6.7	6.4	UD	6.4	6.6	UD	6.6
Delta-BHC	PEST	3.8	UD	3.8	0.38	U	0.38	4.1	UD	4.1	3.9	UD	3.9	4.0	UD	4.0
Dichlorodiphenyldichloroethane	PEST	5.1	UD	5.1	0.52	U	0.52	5.5	UD	5.5	5.3	UD	5.3	5.4	UD	5.4
Dichlorodiphenyldichloroethylene	PEST	4.4	JXD	2.2	6.9		0.23	12	JD	2.4	2.3	UD	2.3	2.4	UD	2.4
Dichlorodiphenyltrichloroethane	PEST	7.4	JD	5.5	5.9		0.56	11	JD	6.0	5.7	UD	5.7	5.8	UD	5.8
Dieldrin	PEST	3.4	JXD	2.0	7.9		0.20	32	D	2.1	11	JD	2.0	2.1	UD	2.1
Endosulfan I	PEST	1.7	UD	1.7	0.17	U	0.17	1.8	UD	1.8	1.7	UD	1.7	1.7	UD	1.7
Endosulfan II	PEST	2.7	UD	2.7	0.27	U	0.27	2.9	UD	2.9	2.8	UD	2.8	2.8	UD	2.8
Endosulfan sulfate	PEST	2.6	UD	2.6	0.26	U	0.26	2.8	UD	2.8	2.7	UD	2.7	2.7	UD	2.7
Endrin	PEST	2.9	UD	2.9	0.29	U	0.29	3.1	UD	3.1	3.0	UD	3.0	3.0	UD	3.0
Endrin aldehyde	PEST	1.6	UD	1.6	0.16	U	0.16	1.7	UD	1.7	1.6	UD	1.6	1.7	UD	1.7
Endrin ketone	PEST	4.6	UD	4.6	0.46	U	0.46	5.0	UD	5.0	4.7	UD	4.7	4.8	UD	4.8
Gamma-BHC (Lindane)	PEST	4.4	UD	4.4	0.44	U	0.44	4.7	UD	4.7	4.5	UD	4.5	4.6	UD	4.6
gamma-Chlordane	PEST	3.6	JD	2.5	1.7		0.25	5.4	JD	2.7	2.6	UD	2.6	2.6	UD	2.6
Heptachlor	PEST	2.0	UD	2.0	0.20	U	0.20	2.2	UD	2.2	2.1	UD	2.1	2.1	UD	2.1
Heptachlor epoxide	PEST	4.0	UD	4.0	0.40	U	0.40	4.3	UD	4.3	4.1	UD	4.1	4.2	UD	4.2
Methoxychlor	PEST	4.2	UD	4.2	0.43	U	0.43	4.6	UD	4.6	4.3	UD	4.3	4.5	UD	4.5
Toxaphene	PEST	150	UD	150	15	U	15	160	UD	160	150	UD	150	160	UD	160
1,2,4-Trichlorobenzene	SVOA	27	U	27	28	U	28	26	U	26	27	U	27	27	U	27
1,2-Dichlorobenzene	SVOA	21	U	21	22	U	22	20	U	20	21	U	21	21	U	21
1,3-Dichlorobenzene	SVOA	11	U	11	12	U	12	11	U	11	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	14	U	14	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
2,4,6-Trichlorophenol	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
2,4-Dichlorophenol	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
2,4-Dimethylphenol	SVOA	63	U	63	66	U	66	61	U	61	64	U	64	63	U	63
2,4-Dinitrophenol	SVOA	320	U	320	330	U	330	310	U	310	320	U	320	320	U	320
2,4-Dinitrotoluene	SVOA	63	U	63	66	U	66	61	U	61	64	U	64	63	U	63
2,6-Dinitrotoluene	SVOA	27	U	27	28	U	28	26	U	26	27	U	27	27	U	27
2-Chloronaphthalene	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
2-Chlorophenol	SVOA	20	U	20	21	U	21	20	U	20	20	U	20	20	U	20
2-Methylnaphthalene	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	12	U	12	13	U	13	12	U	12	13	U	13	12	U	12
2-Nitroaniline	SVOA	47	U	47	50	U	50	46	U	46	49	U	49	48	U	48
2-Nitrophenol	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
3,3'-Dichlorobenzidine	SVOA	85	U	85	90	U	90	84	U	84	88	U	88	86	U	86
3+4 Methylphenol (cresol, m+p)	SVOA	31	U	31	33	U	33	31	U	31	32	U	32	32	U	32
3-Nitroaniline	SVOA	69	U	69	73	U	73	68	U	68	71	U	71	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	310	U	310	330	U	330	310	U	310	320	U	320	320	U	320
4-Bromophenylphenyl ether	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	63	U	63	66	U	66	61	U	61	64	U	64	63	U	63
4-Chloroaniline	SVOA	78	U	78	82	U	82	76	U	76	80	U	80	78	U	78
4-Chlorophenylphenyl ether	SVOA	20	U	20	21	U	21	20	U	20	20	U	20	20	U	20
4-Nitroaniline	SVOA	69	U	69	72	U	72	67	U	67	71	U	71	69	U	69
4-Nitrophenol	SVOA	92	U	92	97	U	97	90	U	90	94	U	94	93	U	93

Attachment	1	Sheet No.	7 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-9 J1K3P0 6/29/2011			Duplicate of J1K3P0 J1K3P4 6/29/2011			NX-1 J1K3N2 6/29/2011			NX-2 J1K3N3 6/29/2011			NX-3 J1K3N4 6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	9.8	U	9.8	10	U	10	9.6	U	9.6	10	U	10	9.8	U	9.8
Acenaphthylene	SVOA	16	U	16	17	U	17	16	U	16	17	U	17	16	U	16
Anthracene	SVOA	16	U	16	17	U	17	16	U	16	17	U	17	25	J	16
Benzo(a)anthracene	SVOA	19	U	19	20	U	20	40	J	19	19	U	19	120	J	19
Benzo(a)pyrene	SVOA	19	U	19	20	U	20	37	J	19	19	U	19	110	J	19
Benzo(b)fluoranthene	SVOA	25	U	25	26	U	26	65	JK	24	28	JK	26	210	JK	25
Benzo(ghi)perylene	SVOA	15	U	15	16	U	16	24	J	15	16	J	16	71	J	15
Benzo(k)fluoranthene	SVOA	38	U	38	40	U	40	37	UK	37	39	UK	39	38	UK	38
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	23	U	23	21	U	21	22	U	22	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	23	U	23	21	U	21	22	U	22	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	17	U	17	15	U	15	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	90	JB	44	79	JB	46	68	JB	43	91	JB	45	71	JB	44
Butylbenzylphthalate	SVOA	41	U	41	43	U	43	40	U	40	42	U	42	41	U	41
Carbazole	SVOA	34	U	34	36	U	36	33	U	33	35	U	35	34	U	34
Chrysene	SVOA	26	U	26	27	U	27	44	J	25	26	U	26	140	J	26
Dibenz[a,h]anthracene	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	21	J	18
Dibenzofuran	SVOA	19	U	19	20	U	20	19	U	19	19	U	19	19	U	19
Diethyl phthalate	SVOA	25	U	25	26	U	26	24	U	24	25	U	25	25	U	25
Dimethyl phthalate	SVOA	22	U	22	23	U	23	21	U	21	22	U	22	22	U	22
Di-n-butylphthalate	SVOA	120	J	27	29	U	29	27	U	27	42	J	28	28	U	28
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	13	U	13	14	U	14	14	U	14
Fluoranthene	SVOA	34	U	34	36	U	36	71	J	33	35	U	35	360		34
Fluorene	SVOA	17	U	17	18	U	18	17	U	17	18	U	18	17	U	17
Hexachlorobenzene	SVOA	27	U	27	29	U	29	27	U	27	28	U	28	28	U	28
Hexachlorobutadiene	SVOA	9.5	U	9.5	10	U	10	9.3	U	9.3	9.7	U	9.7	9.6	U	9.6
Hexachlorocyclopentadiene	SVOA	47	U	47	50	U	50	46	U	46	49	U	49	48	U	48
Hexachloroethane	SVOA	20	U	20	21	U	21	20	U	20	21	U	21	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	21	U	21	22	U	22	21	J	20	21	U	21	60	J	21
Isophorone	SVOA	16	U	16	17	U	17	16	U	16	17	U	17	16	U	16
Naphthalene	SVOA	29	U	29	31	U	31	29	U	29	30	U	30	30	U	30
Nitrobenzene	SVOA	21	U	21	22	U	22	20	U	20	21	U	21	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	29	U	29	31	U	31	29	U	29	30	U	30	30	U	30
N-Nitrosodiphenylamine	SVOA	20	U	20	21	U	21	20	U	20	20	U	20	20	U	20
Pentachlorophenol	SVOA	310	U	310	330	U	330	310	U	310	320	U	320	320	U	320
Phenanthrene	SVOA	16	U	16	17	U	17	39	J	16	17	U	17	220	J	16
Phenol	SVOA	17	U	17	18	U	18	17	U	17	18	U	18	17	U	17
Pyrene	SVOA	15	J	11	16	J	12	74	J	11	23	J	12	270	J	12

Attachment	1	Sheet No.	8 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-4 resample 1[a] J1KNK0			NX-5 resample 1[a] J1KNK1			NX-6 J1K3N7			NX-7 J1K3N8			NX-8 J1K3N9		
		8/9/2011			8/9/2011			6/29/2011			6/29/2011			6/29/2011		
		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	16	JX	10	9.9	U	9.9	9.7	U	9.7
Acenaphthylene	PAH	9.1	U	9.1	9.3	U	9.3	9.0	U	9.0	8.9	U	8.9	8.7	U	8.7
Anthracene	PAH	3.1	U	3.1	3.1	U	3.1	15	JX	3.0	3.0	U	3.0	3.0	U	3.0
Benzo(a)anthracene	PAH	3.2	U	3.2	3.3	U	3.3	53		3.2	12	J	3.2	8.2	J	3.1
Benzo(a)pyrene	PAH	6.5	U	6.5	6.6	U	6.6	67		6.4	15		6.4	8.2	J	6.2
Benzo(b)fluoranthene	PAH	4.2	U	4.2	4.3	U	4.3	67		4.2	4.2	U	4.2	14	JX	4.1
Benzo(ghi)perylene	PAH	7.3	U	7.3	7.4	U	7.4	17	J	7.2	7.1	U	7.1	7.0	U	7.0
Benzo(k)fluoranthene	PAH	4	U	4	4.1	U	4.1	24		3.9	3.9	U	3.9	5.2	J	3.8
Chrysene	PAH	4.9	U	4.9	5.0	U	5.0	75		4.8	4.8	U	4.8	19	J	4.7
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	13	U	13	13	U	13	120		13	18	J	13	18	J	13
Fluorene	PAH	5.3	U	5.3	5.4	U	5.4	12	J	5.3	5.2	U	5.2	5.1	U	5.1
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	40		12	12	U	12	12	U	12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	12	U	12	12	U	12	100		12	12	J	12	12	U	12
Pyrene	PAH	12	U	12	12	U	12	140		12	16	JX	12	16	JX	12
Aroclor-1016	PCB	2.9	U	2.9	2.9	U	2.9	2.6	U	2.6	2.7	U	2.7	2.8	U	2.8
Aroclor-1221	PCB	8.5	U	8.5	8.5	U	8.5	7.7	U	7.7	7.8	U	7.8	8.0	U	8.0
Aroclor-1232	PCB	2.1	U	2.1	2.1	U	2.1	1.9	U	1.9	1.9	U	1.9	2.0	U	2.0
Aroclor-1242	PCB	4.9	U	4.9	4.9	U	4.9	4.5	U	4.5	4.5	U	4.5	4.6	U	4.6
Aroclor-1248	PCB	4.9	U	4.9	4.9	U	4.9	4.5	U	4.5	4.5	U	4.5	4.6	U	4.6
Aroclor-1254	PCB	2.8	U	2.8	2.7	U	2.7	2.5	U	2.5	2.5	U	2.5	2.6	U	2.6
Aroclor-1260	PCB	2.8	U	2.8	3.1	J	2.7	12	P	2.5	29	P	2.5	8.7	J	2.6
Aldrin	PEST	0.25	U	0.25	0.26	U	0.26	2.5	UD	2.5	2.5	UD	2.5	2.4	UD	2.4
Alpha-BHC	PEST	0.21	U	0.21	0.22	U	0.22	2.2	UD	2.2	2.1	UD	2.1	2.1	UD	2.1
alpha-Chlordane	PEST	0.32	U	0.32	1.4	J	0.33	4.9	JD	3.2	28	D	3.2	4.5	JD	3.1
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	0.66	U	0.66	0.68	U	0.68	6.7	UD	6.7	6.6	UD	6.6	6.4	UD	6.4
Delta-BHC	PEST	0.40	U	0.40	0.41	U	0.41	4.0	UD	4.0	4.0	UD	4.0	3.8	UD	3.8
Dichlorodiphenyldichloroethane	PEST	0.54	U	0.54	0.56	U	0.56	5.5	UD	5.5	5.5	UD	5.5	5.2	UD	5.2
Dichlorodiphenyldichloroethylene	PEST	0.24	U	0.24	0.74	J	0.25	2.4	UD	2.4	2.4	UD	2.4	2.3	UD	2.3
Dichlorodiphenyltrichloroethane	PEST	0.58	U	0.58	0.89	J	0.61	5.9	UD	5.9	5.9	UD	5.9	5.7	UD	5.7
Dieldrin	PEST	3.1		0.21	1.5	J	0.22	6.4	JD	2.1	2.2	JXD	2.1	2.0	UD	2.0
Endosulfan I	PEST	0.17	U	0.17	0.18	U	0.18	1.8	UD	1.8	1.8	UD	1.8	1.7	UD	1.7
Endosulfan II	PEST	0.28	U	0.28	0.30	U	0.30	2.9	UD	2.9	2.9	UD	2.9	2.8	UD	2.8
Endosulfan sulfate	PEST	0.27	U	0.27	0.28	U	0.28	2.8	UD	2.8	2.8	UD	2.8	2.6	UD	2.6
Endrin	PEST	0.30	U	0.30	0.32	U	0.32	3.1	UD	3.1	3.1	UD	3.1	2.9	UD	2.9
Endrin aldehyde	PEST	0.17	U	0.17	0.18	U	0.18	1.7	UD	1.7	1.7	UD	1.7	1.6	UD	1.6
Endrin ketone	PEST	0.48	U	0.48	0.50	U	0.50	4.9	UD	4.9	4.9	UD	4.9	4.7	UD	4.7
Gamma-BHC (Lindane)	PEST	0.46	U	0.46	0.48	U	0.48	4.7	UD	4.7	4.6	UD	4.6	4.4	UD	4.4
gamma-Chlordane	PEST	0.26	U	0.26	1.1	J	0.27	6.0	JD	2.7	22	D	2.7	3.3	JD	2.5
Heptachlor	PEST	0.21	U	0.21	0.22	U	0.22	2.2	UD	2.2	2.1	UD	2.1	2.1	UD	2.1
Heptachlor epoxide	PEST	0.42	U	0.42	0.44	U	0.44	4.3	UD	4.3	4.3	UD	4.3	4.1	UD	4.1
Methoxychlor	PEST	0.45	U	0.45	0.46	U	0.46	4.5	UD	4.5	4.5	UD	4.5	4.3	UD	4.3
Toxaphene	PEST	16	U	16	16	U	16	160	UD	160	160	UD	160	150	UD	150
1,2,4-Trichlorobenzene	SVOA	29	U	29	28	U	28	26	U	26	28	U	28	27	U	27
1,2-Dichlorobenzene	SVOA	23	U	23	22	U	22	21	U	21	22	U	22	21	U	21
1,3-Dichlorobenzene	SVOA	13	U	13	12	U	12	11	U	11	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	14	U	14	14	U	14	13	U	13	14	U	14	13	U	13
2,4,5-Trichlorophenol	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
2,4,6-Trichlorophenol	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
2,4-Dichlorophenol	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
2,4-Dimethylphenol	SVOA	69	U	69	67	U	67	62	U	62	67	U	67	62	U	62
2,4-Dinitrophenol	SVOA	350	UX	350	340	U	340	310	U	310	340	U	340	320	U	320
2,4-Dinitrotoluene	SVOA	69	U	69	67	U	67	62	U	62	67	U	67	62	U	62
2,6-Dinitrotoluene	SVOA	29	U	29	28	U	28	26	U	26	28	U	28	27	U	27
2-Chloronaphthalene	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
2-Chlorophenol	SVOA	22	U	22	21	U	21	20	U	20	21	U	21	20	U	20
2-Methylnaphthalene	SVOA	20	U	20	19	U	19	18	U	18	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	14	U	14	13	U	13	12	U	12	13	U	13	12	U	12
2-Nitroaniline	SVOA	52	U	52	51	U	51	47	U	47	50	U	50	47	U	47
2-Nitrophenol	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
3,3'-Dichlorobenzidine	SVOA	94	U	94	91	U	91	85	U	85	91	U	91	85	U	85
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	33	U	33	31	U	31	33	U	33	31	U	31
3-Nitroaniline	SVOA	76	U	76	74	U	74	69	U	69	74	U	74	69	U	69
4,6-Dinitro-2-methylphenol	SVOA	350	UX	350	330	U	330	310	U	310	330	U	330	310	U	310
4-Bromophenylphenyl ether	SVOA	20	U	20	19	U	19	18	U	18	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	69	U	69	67	U	67	62	U	62	67	U	67	62	U	62
4-Chloroaniline	SVOA	86	U	86	83	U	83	77	U	77	83	U	83	78	U	78
4-Chlorophenylphenyl ether	SVOA	22	U	22	21	U	21	20	U	20	21	U	21	20	U	20
4-Nitroaniline	SVOA	76	U	76	73	U	73	68	U	68	73	U	73	69	U	69
4-Nitrophenol	SVOA	100	U	100	98	U	98	91	U	91	98	U	98	92	U	92

Attachment	1	Sheet No.	9 of 36
Originator	N. Kobayashi	Date	10/03/11
Checked	J. D. Skoglie	Date	10/03/11
Calc. No.	0100F-CA-V0392	Rev. No.	1

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-4 resample 1[a] J1KNK0			NX-5 resample 1[a] J1KNK1			NX-6 J1K3N7			NX-7 J1K3N8			NX-8 J1K3N9		
		8/9/2011			8/9/2011			6/29/2011			6/29/2011			6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	11	U	11	10	U	10	9.7	U	9.7	10	U	10	9.7	U	9.7
Acenaphthylene	SVOA	18	U	18	17	U	17	16	U	16	17	U	17	16	U	16
Anthracene	SVOA	18	U	18	17	U	17	16	J	16	17	U	17	16	U	16
Benzo(a)anthracene	SVOA	21	U	21	20	U	20	53	J	19	20	U	20	26	J	19
Benzo(a)pyrene	SVOA	21	U	21	20	U	20	48	J	19	20	U	20	29	J	19
Benzo(b)fluoranthene	SVOA	27	U	27	27	U	27	88	JK	25	34	JK	26	43	JK	25
Benzo(ghi)perylene	SVOA	17	U	17	16	U	16	29	J	15	16	U	16	16	J	15
Benzo(k)fluoranthene	SVOA	42	U	42	41	U	41	38	UK	38	40	UK	40	38	UK	38
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	23	U	23	22	U	22	23	U	23	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	23	U	23	22	U	22	23	U	23	22	U	22
Bis(2-chloroethyl) ether	SVOA	17	U	17	17	U	17	16	U	16	17	U	17	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	82	JB	47	87	JB	43	83	JB	46	71	JB	44
Butylbenzylphthalate	SVOA	45	U	45	44	U	44	40	U	40	43	U	43	41	U	41
Carbazole	SVOA	38	U	38	36	U	36	34	U	34	36	U	36	34	U	34
Chrysene	SVOA	28	U	28	27	U	27	58	J	25	27	U	27	33	J	26
Dibenz[a,h]anthracene	SVOA	20	U	20	19	U	19	18	U	18	19	U	19	18	U	18
Dibenzofuran	SVOA	21	U	21	20	U	20	19	U	19	20	U	20	19	U	19
Diethyl phthalate	SVOA	27	U	27	26	U	26	24	U	24	26	U	26	25	U	25
Dimethyl phthalate	SVOA	24	U	24	23	U	23	22	U	22	23	U	23	22	U	22
Di-n-butylphthalate	SVOA	30	U	30	29	U	29	49	J	27	35	J	29	27	U	27
Di-n-octylphthalate	SVOA	15	U	15	15	U	15	14	U	14	15	U	15	14	U	14
Fluoranthene	SVOA	38	U	38	36	U	36	110	J	34	36	U	36	34	U	34
Fluorene	SVOA	19	U	19	18	U	18	17	U	17	18	U	18	17	U	17
Hexachlorobenzene	SVOA	30	U	30	29	U	29	27	U	27	29	U	29	27	U	27
Hexachlorobutadiene	SVOA	10	U	10	10	U	10	9.4	U	9.4	10	U	10	9.5	U	9.5
Hexachlorocyclopentadiene	SVOA	52	UX	52	51	U	51	47	U	47	50	U	50	47	U	47
Hexachloroethane	SVOA	22	U	22	22	U	22	20	U	20	21	U	21	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	22	U	22	28	J	21	22	U	22	21	U	21
Isophorone	SVOA	18	U	18	17	U	17	16	U	16	17	U	17	16	U	16
Naphthalene	SVOA	32	U	32	31	U	31	29	U	29	31	U	31	29	U	29
Nitrobenzene	SVOA	23	U	23	22	U	22	21	U	21	22	U	22	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	31	U	31	29	U	29	31	U	31	29	U	29
N-Nitrosodiphenylamine	SVOA	22	U	22	21	U	21	20	U	20	21	U	21	20	U	20
Pentachlorophenol	SVOA	350	U	350	330	U	330	310	U	310	330	U	330	310	U	310
Phenanthrene	SVOA	18	U	18	17	U	17	84	J	16	21	J	17	16	U	16
Phenol	SVOA	23	J	19	25	J	18	17	U	17	18	U	18	17	U	17
Pyrene	SVOA	13	U	13	12	U	12	110	J	11	26	J	12	45	J	11

Attachment	1	Sheet No.	10 of 36
Originator	N. Kobayashi	Date	10/03/11
Checked	J. D. Skoglie	Date	10/03/11
Calc. No.	0100F-CA-V0392	Rev. No.	1

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-10 resample 1* J1KNK2 8/9/2011			NX-11 J1K3P2 6/29/2011			NX-12 J1K3P3 6/29/2011			Equipment Blank J1K3P5 6/29/2011			SX-12 resample 1* J1KNL1 8/10/2011		
		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	9.5	U	9.5	9.7	U	9.7				9.8	U	9.8
Acenaphthylene	PAH	9.1	U	9.1	8.5	U	8.5	8.8	U	8.8				8.8	U	8.8
Anthracene	PAH	3.1	U	3.1	5.8	JX	2.9	3.0	U	3.0				3.0	U	3.0
Benzo(a)anthracene	PAH	3.2	U	3.2	22	X	3.0	4.0	JX	3.1				13	J	3.1
Benzo(a)pyrene	PAH	6.5	U	6.5	22		6.1	16		6.2				9.1	JX	6.3
Benzo(b)fluoranthene	PAH	4.2	U	4.2	20	X	4.0	19		4.1				7.8	J	4.1
Benzo(ghi)perylene	PAH	7.3	U	7.3	6.8	U	6.8	7.0	U	7.0				7.0	U	7.0
Benzo(k)fluoranthene	PAH	4.0	U	4.0	8.4	J	3.7	7.1	J	3.8				4.9	J	3.8
Chrysene	PAH	4.9	U	4.9	29	J	4.6	9.1	JX	4.7				13	J	4.7
Dibenz[a,h]anthracene	PAH	11	U	11	10	U	10	11	U	11				11	U	11
Fluoranthene	PAH	13	U	13	52		12	13	U	13				25	J	13
Fluorene	PAH	5.3	U	5.3	6.3	J	5	5.1	U	5.1				5.2	U	5.2
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	18	J	11	12	U	12				12	U	12
Naphthalene	PAH	12	U	12	11	U	11	12	U	12				12	U	12
Phenanthrene	PAH	12	U	12	46		11	12	U	12				12	J	12
Pyrene	PAH	12	U	12	59		11	12	U	12				30	J	12
Aroclor-1016	PCB	2.9	U	2.9	2.7	U	2.7	2.6	U	2.6				2.7	U	2.7
Aroclor-1221	PCB	8.5	U	8.5	7.9	U	7.9	7.5	U	7.5				7.7	U	7.7
Aroclor-1232	PCB	2.1	U	2.1	2	U	2	1.9	U	1.9				1.9	U	1.9
Aroclor-1242	PCB	4.9	U	4.9	4.6	U	4.6	4.4	U	4.4				4.5	U	4.5
Aroclor-1248	PCB	4.9	U	4.9	4.6	U	4.6	4.4	U	4.4				4.5	U	4.5
Aroclor-1254	PCB	2.8	U	2.8	2.6	U	2.6	2.4	U	2.4				2.5	U	2.5
Aroclor-1260	PCB	2.8	U	2.8	5.2	J	2.6	2.4	U	2.4				2.5	U	2.5
Aldrin	PEST	0.25	U	0.25	2.5	UD	2.5	0.23	U	0.23						
Alpha-BHC	PEST	0.21	U	0.21	2.1	UD	2.1	0.20	U	0.20						
alpha-Chlordane	PEST	0.32	U	0.32	3.2	UD	3.2	0.30	U	0.30						
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	0.66	U	0.66	6.6	UD	6.6	0.61	U	0.61						
Delta-BHC	PEST	0.40	U	0.40	4.0	UD	4.0	0.37	U	0.37						
Dichlorodiphenyldichloroethane	PEST	0.54	U	0.54	5.4	UD	5.4	0.50	U	0.50						
Dichlorodiphenyldichloroethylene	PEST	0.24	U	0.24	2.4	UD	2.4	0.22	U	0.22						
Dichlorodiphenyltrichloroethane	PEST	0.58	U	0.58	5.8	UD	5.8	0.54	U	0.54						
Dieldrin	PEST	3.1		0.21	2.1	UD	2.1	0.19	U	0.19						
Endosulfan I	PEST	0.17	U	0.17	1.7	UD	1.7	0.16	U	0.16						
Endosulfan II	PEST	0.28	U	0.28	2.8	UD	2.8	0.26	U	0.26						
Endosulfan sulfate	PEST	0.27	U	0.27	2.7	UD	2.7	0.25	U	0.25						
Endrin	PEST	0.30	U	0.30	3.0	UD	3.0	0.28	U	0.28						
Endrin aldehyde	PEST	0.17	U	0.17	1.7	UD	1.7	0.16	U	0.16						
Endrin ketone	PEST	0.48	U	0.48	4.8	UD	4.8	0.45	U	0.45						
Gamma-BHC (Lindane)	PEST	0.46	U	0.46	4.6	UD	4.6	0.43	U	0.43						
gamma-Chlordane	PEST	0.26	U	0.26	2.6	UD	2.6	0.71	J	0.24						
Heptachlor	PEST	0.21	U	0.21	2.1	UD	2.1	0.20	U	0.20						
Heptachlor epoxide	PEST	0.42	U	0.42	4.2	UD	4.2	0.39	U	0.39						
Methoxychlor	PEST	0.45	U	0.45	4.4	UD	4.4	0.41	U	0.41						
Toxaphene	PEST	16	U	16	160	UD	160	15	U	15						
1,2,4-Trichlorobenzene	SVOA	29	U	29	27	U	27	28	U	28	27	U	27	26	U	26
1,2-Dichlorobenzene	SVOA	23	U	23	22	U	22	22	U	22	22	U	22	20	U	20
1,3-Dichlorobenzene	SVOA	13	U	13	12	U	12	12	U	12	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	14	U	14	13	U	13	14	U	14	13	U	13	12	U	12
2,4,5-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
2,4,6-Trichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
2,4-Dichlorophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
2,4-Dimethylphenol	SVOA	69	U	69	65	U	65	66	U	66	65	U	65	60	U	60
2,4-Dinitrophenol	SVOA	350	UX	350	330	U	330	330	U	330	330	U	330	300	U	300
2,4-Dinitrotoluene	SVOA	69	U	69	65	U	65	66	U	66	65	U	65	60	U	60
2,6-Dinitrotoluene	SVOA	29	U	29	27	U	27	28	U	28	27	U	27	26	U	26
2-Chloronaphthalene	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
2-Chlorophenol	SVOA	22	U	22	21	U	21	21	U	21	21	U	21	19	U	19
2-Methylnaphthalene	SVOA	20	U	20	19	U	19	19	U	19	19	U	19	17	U	17
2-Methylphenol (cresol, o-)	SVOA	14	U	14	13	U	13	13	U	13	13	U	13	12	U	12
2-Nitroaniline	SVOA	52	U	52	49	U	49	50	U	50	49	U	49	46	U	46
2-Nitrophenol	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
3,3'-Dichlorobenzidine	SVOA	94	U	94	88	U	88	90	U	90	88	U	88	82	U	82
3+4 Methylphenol (cresol, m+p)	SVOA	35	U	35	32	U	32	33	U	33	32	U	32	30	U	30
3-Nitroaniline	SVOA	76	U	76	71	U	71	73	U	73	71	U	71	67	U	67
4,6-Dinitro-2-methylphenol	SVOA	350	UX	350	320	U	320	330	U	330	320	U	320	300	U	300
4-Bromophenylphenyl ether	SVOA	20	U	20	19	U	19	19	U	19	19	U	19	17	U	17
4-Chloro-3-methylphenol	SVOA	69	U	69	65	U	65	66	U	66	65	U	65	60	U	60
4-Chloroaniline	SVOA	86	U	86	80	U	80	82	U	82	80	U	80	75	U	75
4-Chlorophenylphenyl ether	SVOA	22	U	22	21	U	21	21	U	21	21	U	21	19	U	19
4-Nitroaniline	SVOA	76	U	76	71	U	71	73	U	73	71	U	71	66	U	66
4-Nitrophenol	SVOA	100	U	100	95	U	95	97	U	97	95	U	95	89	U	89

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Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-10 resample 1[a] J1KNK2 8/9/2011			NX-11 J1K3P2 6/29/2011			NX-12 J1K3P3 6/29/2011			Equipment Blank J1K3P5 6/29/2011			SX-12 resample 1[a] J1KNL1 8/10/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	11	U	11	10	U	10	10	U	10	10	U	10	9.4	U	9.4
Acenaphthylene	SVOA	18	U	18	17	U	17	17	U	17	17	U	17	16	U	16
Anthracene	SVOA	18	U	18	17	U	17	17	U	17	17	U	17	16	U	16
Benzo(a)anthracene	SVOA	21	U	21	25	J	20	20	U	20	20	U	20	18	U	18
Benzo(a)pyrene	SVOA	21	U	21	21	J	20	20	U	20	20	U	20	18	U	18
Benzo(b)fluoranthene	SVOA	27	U	27	38	JK	26	26	U	26	26	U	26	24	U	24
Benzo(ghi)perylene	SVOA	17	U	17	16	U	16	16	U	16	16	U	16	15	U	15
Benzo(k)fluoranthene	SVOA	42	U	42	39	UK	39	40	U	40	39	U	39	37	U	37
Bis(2-chloro-1-methylethyl)ether	SVOA	24	U	24	23	U	23	23	U	23	22	U	22	21	U	21
Bis(2-Chloroethoxy)methane	SVOA	24	U	24	23	U	23	23	U	23	22	U	22	21	U	21
Bis(2-chloroethyl) ether	SVOA	17	U	17	16	U	16	17	U	17	16	U	16	15	U	15
Bis(2-ethylhexyl) phthalate	SVOA	48	U	48	77	JB	45	81	JB	46	75	JB	45	42	U	42
Butylbenzylphthalate	SVOA	45	U	45	42	U	42	43	U	43	42	U	42	39	U	39
Carbazole	SVOA	38	U	38	35	U	35	36	U	36	35	U	35	33	U	33
Chrysene	SVOA	28	U	28	26	U	26	27	U	27	26	U	26	25	U	25
Dibenz[a,h]anthracene	SVOA	20	U	20	19	U	19	19	U	19	19	U	19	17	U	17
Dibenzofuran	SVOA	21	U	21	20	U	20	20	U	20	20	U	20	18	U	18
Diethyl phthalate	SVOA	27	U	27	25	U	25	26	U	26	25	U	25	24	U	24
Dimethyl phthalate	SVOA	24	U	24	23	U	23	23	U	23	22	U	22	21	U	21
Di-n-butylphthalate	SVOA	30	U	30	28	U	28	29	U	29	28	U	28	26	U	26
Di-n-octylphthalate	SVOA	15	U	15	14	U	14	14	U	14	14	U	14	13	U	13
Fluoranthene	SVOA	38	U	38	42	J	35	36	U	36	35	U	35	33	U	33
Fluorene	SVOA	19	U	19	18	U	18	18	U	18	18	U	18	16	U	16
Hexachlorobenzene	SVOA	30	U	30	28	U	28	29	U	29	28	U	28	26	U	26
Hexachlorobutadiene	SVOA	10	U	10	9.8	U	9.8	10	U	10	9.8	U	9.8	9.1	U	9.1
Hexachlorocyclopentadiene	SVOA	52	UX	52	49	U	49	50	U	50	49	U	49	46	U	46
Hexachloroethane	SVOA	22	U	22	21	U	21	21	U	21	21	U	21	19	U	19
Indeno(1,2,3-cd)pyrene	SVOA	23	U	23	22	U	22	22	U	22	22	U	22	20	U	20
Isophorone	SVOA	18	U	18	17	U	17	17	U	17	17	U	17	16	U	16
Naphthalene	SVOA	32	U	32	30	U	30	31	U	31	30	U	30	28	U	28
Nitrobenzene	SVOA	23	U	23	22	U	22	22	U	22	22	U	22	20	U	20
N-Nitroso-di-n-dipropylamine	SVOA	32	U	32	30	U	30	31	U	31	30	U	30	28	U	28
N-Nitrosodiphenylamine	SVOA	22	U	22	21	U	21	21	U	21	21	U	21	19	U	19
Pentachlorophenol	SVOA	350	U	350	320	U	320	330	U	330	320	U	320	300	U	300
Phenanthrene	SVOA	18	U	18	29	J	17	17	U	17	17	U	17	16	U	16
Phenol	SVOA	23	J	19	18	U	18	18	U	18	18	U	18	16	U	16
Pyrene	SVOA	13	U	13	43	J	12	12	U	12	12	U	12	13	J	11

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Checked	J. D. Skoglie	Date	09/29/11
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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	Duplicate of J1KNL1 J1KNL2			SX-1 J1K3T3			SX-2 resample 1[a] J1KNK5			SX-3 resample 1[a] J1KNK6			SX-4 J1K3T6		
		8/10/2011			7/5/2011			8/10/2011			8/10/2011			7/5/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	12	U	12	10	U	10	11	U	11	9.7	U	9.7	9.6	U	9.6
Acenaphthylene	PAH	11	U	11	9.1	U	9.1	9.7	U	9.7	8.7	U	8.7	8.7	U	8.7
Anthracene	PAH	3.6	U	3.6	6.4	J	3.1	3.3	U	3.3	2.9	U	2.9	17	JX	2.9
Benzo(a)anthracene	PAH	3.7	U	3.7	56		3.2	16		3.4	3.1	U	3.1	110	X	3.1
Benzo(a)pyrene	PAH	7.5	U	7.5	37		6.5	17		6.9	6.2	U	6.2	96		6.2
Benzo(b)fluoranthene	PAH	4.9	U	4.9	31		4.2	12	J	4.5	4.1	U	4.1	69	X	4.0
Benzo(ghi)perylene	PAH	8.4	U	8.4	7.9	JX	7.3	7.8	U	7.8	7.0	U	7.0	39		6.9
Benzo(k)fluoranthene	PAH	4.6	U	4.6	15		4.0	6.2	J	4.3	3.8	U	3.8	46		3.8
Chrysene	PAH	5.6	U	5.6	42		4.9	17	J	5.2	4.7	U	4.7	100		4.7
Dibenz[a,h]anthracene	PAH	13	U	13	11	U	11	12	U	12	11	U	11	11	U	11
Fluoranthene	PAH	15	U	15	71		13	25	J	14	13	U	13	190		13
Fluorene	PAH	6.2	U	6.2	5.3	U	5.3	5.7	U	5.7	5.1	U	5.1	5.1	U	5.1
Indeno(1,2,3-cd)pyrene	PAH	14	U	14	25	J	12	13	U	13	12	U	12	52		12
Naphthalene	PAH	14	U	14	12	U	12	13	U	13	12	U	12	12	U	12
Phenanthrene	PAH	14	U	14	19	J	12	13	U	13	12	U	12	72		12
Pyrene	PAH	14	U	14	83		12	31	J	13	12	U	12	250		12
Aroclor-1016	PCB	3.2	U	3.2	2.8	U	2.8	3.0	U	3.0	2.7	U	2.7	2.7	U	2.7
Aroclor-1221	PCB	9.4	U	9.4	8.0	U	8.0	8.6	U	8.6	7.8	U	7.8	7.8	U	7.8
Aroclor-1232	PCB	2.3	U	2.3	2.0	U	2.0	2.2	U	2.2	1.9	U	1.9	2.0	U	2.0
Aroclor-1242	PCB	5.4	U	5.4	4.6	U	4.6	5.0	U	5.0	4.5	U	4.5	4.5	U	4.5
Aroclor-1248	PCB	5.4	U	5.4	4.6	U	4.6	5.0	U	5.0	4.5	U	4.5	4.5	U	4.5
Aroclor-1254	PCB	3.0	U	3.0	2.6	U	2.6	4.5	JP	2.8	2.5	U	2.5	24		2.5
Aroclor-1260	PCB	3.0	U	3.0	2.6	U	2.6	2.8	U	2.8	2.5	U	2.5	2.5	U	2.5
1,2,4-Trichlorobenzene	SVOA	32	U	32	27	U	27	29	U	29	27	U	27	27	U	27
1,2-Dichlorobenzene	SVOA	25	U	25	21	U	21	23	U	23	21	U	21	21	U	21
1,3-Dichlorobenzene	SVOA	14	U	14	12	U	12	12	U	12	11	U	11	12	U	12
1,4-Dichlorobenzene	SVOA	15	U	15	13	U	13	14	U	14	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
2,4,6-Trichlorophenol	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
2,4-Dichlorophenol	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
2,4-Dimethylphenol	SVOA	75	U	75	64	U	64	68	U	68	63	U	63	64	U	64
2,4-Dinitrophenol	SVOA	380	U	380	320	U	320	340	U	340	320	U	320	320	U	320
2,4-Dinitrotoluene	SVOA	75	U	75	64	U	64	68	U	68	63	U	63	64	U	64
2,6-Dinitrotoluene	SVOA	32	U	32	27	U	27	29	U	29	27	U	27	27	U	27
2-Chloronaphthalene	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
2-Chlorophenol	SVOA	24	U	24	20	U	20	22	U	22	20	U	20	20	U	20
2-Methylnaphthalene	SVOA	22	U	22	18	U	18	20	U	20	18	U	18	18	U	18
2-Methylphenol (cresol, o-)	SVOA	15	U	15	13	U	13	13	U	13	12	U	12	13	U	13
2-Nitroaniline	SVOA	57	U	57	48	U	48	51	U	51	48	U	48	49	U	49
2-Nitrophenol	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
3,3'-Dichlorobenzidine	SVOA	100	U	100	87	U	87	92	U	92	86	U	86	87	U	87
3+4 Methylphenol (cresol, m+p)	SVOA	37	U	37	32	U	32	34	U	34	31	U	31	32	U	32
3-Nitroaniline	SVOA	83	U	83	70	U	70	75	U	75	70	U	70	71	U	71
4,6-Dinitro-2-methylphenol	SVOA	370	U	370	320	U	320	340	U	340	310	U	310	320	U	320
4-Bromophenylphenyl ether	SVOA	22	U	22	18	U	18	20	U	20	18	U	18	18	U	18
4-Chloro-3-methylphenol	SVOA	75	U	75	64	U	64	68	U	68	63	U	63	64	U	64
4-Chloroaniline	SVOA	93	U	93	79	U	79	84	U	84	78	U	78	80	U	80
4-Chlorophenylphenyl ether	SVOA	24	U	24	20	U	20	22	U	22	20	U	20	20	U	20
4-Nitroaniline	SVOA	82	U	82	70	U	70	74	U	74	69	U	69	70	U	70
4-Nitrophenol	SVOA	110	U	110	94	U	94	100	U	100	92	U	92	94	U	94

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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	Duplicate of J1KNL1 J1KNL2 8/10/2011			SX-1 J1K3T3 7/5/2011			SX-2 resample 1° J1KNK5 8/10/2011			SX-3 resample 1° J1KNK6 8/10/2011			SX-4 J1K3T6 7/5/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	12	U	12	9.9	U	9.9	11	U	11	9.8	U	9.8	10	J	10
Acenaphthylene	SVOA	19	U	19	16	U	16	17	U	17	16	U	16	17	U	17
Anthracene	SVOA	19	U	19	18	J	16	17	U	17	16	U	16	19	J	17
Benzo(a)anthracene	SVOA	23	U	23	85	J	19	35	J	21	19	U	19	110	J	19
Benzo(a)pyrene	SVOA	23	U	23	71	J	19	23	J	21	19	U	19	87	J	19
Benzo(b)fluoranthene	SVOA	30	U	30	120	JK	25	45	JK	27	25	U	25	150	JK	25
Benzo(ghi)perylene	SVOA	18	U	18	39	J	15	16	U	16	15	U	15	47	J	16
Benzo(k)fluoranthene	SVOA	45	U	45	39	UK	39	41	UK	41	38	U	38	39	UK	39
Bis(2-chloro-1-methylethyl)ether	SVOA	26	U	26	22	U	22	24	U	24	22	U	22	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	26	U	26	22	U	22	24	U	24	22	U	22	22	U	22
Bis(2-chloroethyl) ether	SVOA	19	U	19	16	U	16	17	U	17	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	52	U	52	44	U	44	47	U	47	44	U	44	45	U	45
Butylbenzylphthalate	SVOA	49	U	49	42	U	42	44	U	44	41	U	41	42	U	42
Carbazole	SVOA	41	U	41	35	U	35	37	U	37	34	U	34	35	U	35
Chrysene	SVOA	31	U	31	100	J	26	28	J	28	26	U	26	110	J	26
Dibenz[a,h]anthracene	SVOA	22	U	22	18	U	18	20	U	20	18	U	18	18	U	18
Dibenzofuran	SVOA	23	U	23	19	U	19	21	U	21	19	U	19	19	U	19
Diethyl phthalate	SVOA	30	U	30	25	U	25	27	U	27	25	U	25	25	U	25
Dimethyl phthalate	SVOA	26	U	26	22	U	22	24	U	24	22	U	22	22	U	22
Di-n-butylphthalate	SVOA	33	U	33	28	U	28	30	U	30	28	U	28	28	U	28
Di-n-octylphthalate	SVOA	16	U	16	14	U	14	15	U	15	14	U	14	14	U	14
Fluoranthene	SVOA	41	U	41	160	J	35	47	J	37	34	U	34	200	J	35
Fluorene	SVOA	20	U	20	17	U	17	18	U	18	17	U	17	17	U	17
Hexachlorobenzene	SVOA	33	U	33	28	U	28	30	U	30	28	U	28	28	U	28
Hexachlorobutadiene	SVOA	11	U	11	9.7	U	9.7	10	U	10	9.5	U	9.5	9.7	U	9.7
Hexachlorocyclopentadiene	SVOA	57	U	57	48	U	48	51	U	51	48	U	48	49	U	49
Hexachloroethane	SVOA	24	U	24	21	U	21	22	U	22	20	U	20	21	U	21
Indeno(1,2,3-cd)pyrene	SVOA	25	U	25	36	J	21	23	U	23	21	U	21	43	J	21
Isophorone	SVOA	19	U	19	16	U	16	17	U	17	16	U	16	17	U	17
Naphthalene	SVOA	35	U	35	30	U	30	32	U	32	30	U	30	30	U	30
Nitrobenzene	SVOA	25	U	25	21	U	21	23	U	23	21	U	21	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	35	U	35	30	U	30	32	U	32	30	U	30	30	U	30
N-Nitrosodiphenylamine	SVOA	24	U	24	20	U	20	22	U	22	20	U	20	20	U	20
Pentachlorophenol	SVOA	370	U	370	320	U	320	340	U	340	310	U	310	320	U	320
Phenanthrene	SVOA	19	U	19	75	J	16	17	U	17	16	U	16	110	J	17
Phenol	SVOA	20	U	20	17	U	17	35	J	18	17	U	17	17	U	17
Pyrene	SVOA	14	U	14	180	J	12	53	J	12	12	U	12	210	J	12

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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-5 J1K3T7			SX-6 resample 1[a] J1KNK7			SX-7 resample 1[a] J1KNK8			SX-8 J1K3V0			SX-9 resample 1[a] J1KNK9		
		7/5/2011			8/10/2011			8/10/2011			7/5/2011			8/10/2011		
		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	9.3	U	9.3	10	U	10	9.7	U	9.7	9.6	U	9.6
Acenaphthylene	PAH	8.6	U	8.6	8.4	U	8.4	9.2	U	9.2	8.7	U	8.7	8.6	U	8.6
Anthracene	PAH	14	J	2.9	2.8	U	2.8	21	X	3.1	22		3.0	2.9	U	2.9
Benzo(a)anthracene	PAH	85		3.1	3.0	U	3.0	140		3.2	94		3.1	17		3.1
Benzo(a)pyrene	PAH	78		6.1	6.0	U	6.0	120		6.5	79		6.2	20		6.1
Benzo(b)fluoranthene	PAH	45		4.0	3.9	U	3.9	90		4.3	53	X	4.1	11	JX	4.0
Benzo(ghi)perylene	PAH	30	X	6.9	6.7	U	6.7	20	JX	7.3	25	JX	7.0	6.9	U	6.9
Benzo(k)fluoranthene	PAH	35		3.8	3.7	U	3.7	57		4.0	35		3.8	8.0	J	3.8
Chrysene	PAH	79		4.6	4.5	U	4.5	140		4.9	90		4.7	17	J	4.6
Dibenz[a,h]anthracene	PAH	11	U	11	10	U	10	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	130		12	12	U	12	250		13	160		13	26	J	12
Fluorene	PAH	5.1	U	5.1	4.9	U	4.9	16	J	5.4	7.1	J	5.1	5.1	U	5.1
Indeno(1,2,3-cd)pyrene	PAH	36		11	11	U	11	12	U	12	40		12	11	U	11
Naphthalene	PAH	11	U	11	11	U	11	12	U	12	12	U	12	11	U	11
Phenanthrene	PAH	42		11	11	U	11	87		12	63		12	11	U	11
Pyrene	PAH	160		11	11	U	11	220	X	12	190		12	36	J	11
Aroclor-1016	PCB	2.7	U	2.7	2.7	U	2.7	2.8	U	2.8	11	UD	11	2.7	U	2.7
Aroclor-1221	PCB	7.8	U	7.8	7.7	U	7.7	8.2	U	8.2	32	UD	32	7.7	U	7.7
Aroclor-1232	PCB	2.0	U	2.0	1.9	U	1.9	2.0	U	2.0	7.9	UD	7.9	1.9	U	1.9
Aroclor-1242	PCB	4.5	U	4.5	4.5	U	4.5	4.7	U	4.7	18	UD	18	4.5	U	4.5
Aroclor-1248	PCB	4.5	U	4.5	4.5	U	4.5	4.9	JP	4.7	240	D	18	4.5	U	4.5
Aroclor-1254	PCB	13	P	2.5	2.5	U	2.5	2.6	U	2.6	10	UD	10	2.5	U	2.5
Aroclor-1260	PCB	8.5	J	2.5	2.5	U	2.5	2.6	U	2.6	10	UD	10	2.5	U	2.5
1,2,4-Trichlorobenzene	SVOA	27	U	27	27	U	27	29	U	29	26	U	26	27	U	27
1,2-Dichlorobenzene	SVOA	21	U	21	21	U	21	23	U	23	20	U	20	21	U	21
1,3-Dichlorobenzene	SVOA	11	U	11	12	U	12	12	U	12	11	U	11	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	14	U	14	12	U	12	13	U	13
2,4,5-Trichlorophenol	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
2,4,6-Trichlorophenol	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
2,4-Dichlorophenol	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
2,4-Dimethylphenol	SVOA	63	U	63	63	U	63	68	U	68	60	U	60	63	U	63
2,4-Dinitrophenol	SVOA	320	U	320	320	U	320	340	U	340	300	U	300	320	U	320
2,4-Dinitrotoluene	SVOA	63	U	63	63	U	63	68	U	68	60	U	60	63	U	63
2,6-Dinitrotoluene	SVOA	27	U	27	27	U	27	29	U	29	26	U	26	27	U	27
2-Chloronaphthalene	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
2-Chlorophenol	SVOA	20	U	20	20	U	20	22	U	22	19	U	19	20	U	20
2-Methylnaphthalene	SVOA	18	U	18	18	U	18	20	U	20	17	U	17	18	U	18
2-Methylphenol (cresol, o-)	SVOA	12	U	12	12	U	12	13	U	13	12	U	12	12	U	12
2-Nitroaniline	SVOA	48	U	48	48	U	48	51	U	51	46	U	46	48	U	48
2-Nitrophenol	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
3,3'-Dichlorobenzidine	SVOA	86	U	86	86	U	86	92	U	92	82	U	82	86	U	86
3+4 Methylphenol (cresol, m+p)	SVOA	31	U	31	32	U	32	34	U	34	30	U	30	31	U	31
3-Nitroaniline	SVOA	69	U	69	70	U	70	75	U	75	67	U	67	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	310	U	310	320	U	320	340	U	340	300	U	300	310	U	310
4-Bromophenylphenyl ether	SVOA	18	U	18	18	U	18	20	U	20	17	U	17	18	U	18
4-Chloro-3-methylphenol	SVOA	63	U	63	63	U	63	68	U	68	60	U	60	63	U	63
4-Chloroaniline	SVOA	78	U	78	79	U	79	84	U	84	75	U	75	78	U	78
4-Chlorophenylphenyl ether	SVOA	20	U	20	20	U	20	22	U	22	19	U	19	20	U	20
4-Nitroaniline	SVOA	69	U	69	70	U	70	74	U	74	66	U	66	69	U	69
4-Nitrophenol	SVOA	92	U	92	93	U	93	100	U	100	88	U	88	93	U	93

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-5 J1K3T7			SX-6 resample 1[a] J1KNK7			SX-7 resample 1[a] J1KNK8			SX-8 J1K3V0			SX-9 resample 1[a] J1KNK9		
		7/5/2011			8/10/2011			8/10/2011			7/5/2011			8/10/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	26	J	9.8	9.9	U	9.9	11	U	11	9.4	U	9.4	9.8	U	9.8
Acenaphthylene	SVOA	16	U	16	16	U	16	17	U	17	15	U	15	16	U	16
Anthracene	SVOA	40	J	16	16	U	16	17	U	17	15	U	15	16	U	16
Benzo(a)anthracene	SVOA	130	J	19	19	U	19	100	J	21	59	J	18	19	U	19
Benzo(a)pyrene	SVOA	110	J	19	19	U	19	90	J	21	51	J	18	19	U	19
Benzo(b)fluoranthene	SVOA	170	JK	25	25	U	25	150	JK	27	86	JK	24	25	U	25
Benzo(ghi)perylene	SVOA	62	J	15	15	U	15	53	J	16	28	J	15	15	U	15
Benzo(k)fluoranthene	SVOA	38	UK	38	38	U	38	41	UK	41	36	UK	36	38	U	38
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	22	U	22	24	U	24	21	U	21	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	22	U	22	24	U	24	21	U	21	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	16	U	16	17	U	17	15	U	15	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	44	U	44	44	U	44	47	U	47	42	U	42	44	U	44
Butylbenzylphthalate	SVOA	41	U	41	41	U	41	44	U	44	39	U	39	41	U	41
Carbazole	SVOA	34	U	34	35	U	35	37	U	37	33	U	33	34	U	34
Chrysene	SVOA	150	J	26	26	U	26	120	J	28	70	J	25	26	U	26
Dibenz[a,h]anthracene	SVOA	18	U	18	18	U	18	20	U	20	17	U	17	18	U	18
Dibenzofuran	SVOA	19	U	19	19	U	19	21	U	21	18	U	18	19	U	19
Diethyl phthalate	SVOA	25	U	25	25	U	25	27	U	27	24	U	24	25	U	25
Dimethyl phthalate	SVOA	22	U	22	22	U	22	24	U	24	21	U	21	22	U	22
Di-n-butylphthalate	SVOA	28	U	28	28	U	28	30	U	30	26	U	26	28	U	28
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	15	U	15	13	U	13	14	U	14
Fluoranthene	SVOA	270	J	34	35	U	35	190	J	37	110	J	33	34	U	34
Fluorene	SVOA	17	U	17	17	U	17	18	U	18	16	U	16	17	U	17
Hexachlorobenzene	SVOA	28	U	28	28	U	28	30	U	30	26	U	26	28	U	28
Hexachlorobutadiene	SVOA	9.5	U	9.5	9.6	U	9.6	10	U	10	9.1	U	9.1	9.5	U	9.5
Hexachlorocyclopentadiene	SVOA	48	U	48	48	U	48	51	U	51	46	U	46	48	U	48
Hexachloroethane	SVOA	20	U	20	20	U	20	22	U	22	19	U	19	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	50	J	21	21	U	21	48	J	23	25	J	20	21	U	21
Isophorone	SVOA	16	U	16	16	U	16	17	U	17	15	U	15	16	U	16
Naphthalene	SVOA	29	U	29	30	U	30	32	U	32	28	U	28	30	U	30
Nitrobenzene	SVOA	21	U	21	21	U	21	23	U	23	20	U	20	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	29	U	29	30	U	30	32	U	32	28	U	28	30	U	30
N-Nitrosodiphenylamine	SVOA	20	U	20	20	U	20	22	U	22	19	U	19	20	U	20
Pentachlorophenol	SVOA	310	U	310	320	U	320	340	U	340	300	U	300	310	U	310
Phenanthrene	SVOA	180	J	16	16	U	16	98	J	17	56	J	15	16	U	16
Phenol	SVOA	17	U	17	17	U	17	18	U	18	16	U	16	17	U	17
Pyrene	SVOA	290	J	12	12	U	12	200	J	12	120	J	11	23	J	12

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-10 resample 1[a] J1KNL0 8/10/2011			SX-11 J1K3V3 7/5/2011			Equipment Blank J1K3W5 7/5/2011			SPA-1 J1K3R4 6/29/2011			Duplicate of J1K3R4 J1K3T0 6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.5	U	9.5	9.8	U	9.8				9.8	U	9.8	9.4	U	9.4
Acenaphthylene	PAH	8.5	U	8.5	8.8	U	8.8				8.8	U	8.8	8.5	U	8.5
Anthracene	PAH	2.9	U	2.9	8.5	J	3.0				3.0	U	3.0	2.9	U	2.9
Benzo(a)anthracene	PAH	3.0	U	3.0	51		3.1				13	J	3.1	3.0	U	3.0
Benzo(a)pyrene	PAH	6.1	U	6.1	33		6.3				18		6.3	16		6.0
Benzo(b)fluoranthene	PAH	4.0	U	4.0	23	X	4.1				19	X	4.1	4.0	U	4.0
Benzo(ghi)perylene	PAH	6.8	U	6.8	7.0	U	7.0				9.6	J	7.0	6.8	U	6.8
Benzo(k)fluoranthene	PAH	3.7	U	3.7	12	J	3.9				6.2	J	3.8	3.7	U	3.7
Chrysene	PAH	4.6	U	4.6	40		4.7				29	J	4.7	4.6	U	4.6
Dibenz[a,h]anthracene	PAH	10	U	10	23	JX	11				11	U	11	10	U	10
Fluoranthene	PAH	12	U	12	73		13				26	J	13	38		12
Fluorene	PAH	5.0	U	5.0	5.2	U	5.2				5.1	U	5.1	5.0	U	5.0
Indeno(1,2,3-cd)pyrene	PAH	11	U	11	20	J	12				16	J	12	11	J	11
Naphthalene	PAH	11	U	11	12	U	12				12	U	12	11	U	11
Phenanthrene	PAH	11	U	11	30	J	12				12	JX	12	21	JX	11
Pyrene	PAH	11	U	11	90		12				25	JX	12	30	JX	11
Aroclor-1016	PCB	2.7	U	2.7	2.6	U	2.6				2.7	U	2.7	2.6	U	2.7
Aroclor-1221	PCB	7.7	U	7.7	7.6	U	7.6				7.9	U	7.9	7.6	U	7.7
Aroclor-1232	PCB	1.9	U	1.9	1.9	U	1.9				2.0	U	2.0	1.9	U	1.9
Aroclor-1242	PCB	4.5	U	4.5	4.4	U	4.4				4.6	U	4.6	4.4	U	4.5
Aroclor-1248	PCB	4.5	U	4.5	4.4	U	4.4				4.6	U	4.6	4.4	U	4.5
Aroclor-1254	PCB	2.5	U	2.5	3.2	JP	2.5				2.6	U	2.6	8.4	J	2.5
Aroclor-1260	PCB	2.5	U	2.5	2.5	U	2.5				2.9	J	2.6	7.2	J	2.5
Aldrin	PEST										2.4	UD	2.4	2.4	UD	2.4
Alpha-BHC	PEST										2.0	UD	2.0	2.0	UD	2.1
alpha-Chlordane	PEST										3.1	UD	3.1	3.0	UD	3.1
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST										6.4	UD	6.4	6.2	UD	6.4
Delta-BHC	PEST										3.8	UD	3.8	3.8	UD	3.9
Dichlorodiphenyldichloroethane	PEST										5.2	UD	5.2	5.1	UD	5.3
Dichlorodiphenyldichloroethylene	PEST										2.3	UD	2.3	2.2	UD	2.3
Dichlorodiphenyltrichloroethane	PEST										5.6	UD	5.6	5.5	UD	5.7
Dieldrin	PEST										2.0	UD	2.0	2.0	UD	2.0
Endosulfan I	PEST										1.7	UD	1.7	1.7	UD	1.7
Endosulfan II	PEST										2.7	UD	2.7	2.7	UD	2.8
Endosulfan sulfate	PEST										2.6	UD	2.6	2.6	UD	2.7
Endrin	PEST										2.9	UD	2.9	2.9	UD	3.0
Endrin aldehyde	PEST										1.6	UD	1.6	1.6	UD	1.7
Endrin ketone	PEST										4.7	UD	4.7	4.6	UD	4.7
Gamma-BHC (Lindane)	PEST										4.4	UD	4.4	4.4	UD	4.5
gamma-Chlordane	PEST										2.5	UD	2.5	2.5	UD	2.6
Heptachlor	PEST										2.0	UD	2.0	2.0	UD	2.1
Heptachlor epoxide	PEST										4.1	UD	4.1	4.0	UD	4.1
Methoxychlor	PEST										4.3	UD	4.3	4.2	UD	4.4
Toxaphene	PEST										150	UDJ	150	150	UDJ	150
1,2,4-Trichlorobenzene	SVOA	26	U	26	26	U	26	27	U	27	28	U	28	26	U	26
1,2-Dichlorobenzene	SVOA	21	U	21	20	U	20	21	U	21	22	U	22	21	U	21
1,3-Dichlorobenzene	SVOA	11	U	11	11	U	11	12	U	12	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
2,4,6-Trichlorophenol	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
2,4-Dichlorophenol	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
2,4-Dimethylphenol	SVOA	62	U	62	61	U	61	63	U	63	65	U	65	62	U	62
2,4-Dinitrophenol	SVOA	310	U	310	310	U	310	320	U	320	330	U	330	310	U	310
2,4-Dinitrotoluene	SVOA	62	U	62	61	U	61	63	U	63	65	U	65	62	U	62
2,6-Dinitrotoluene	SVOA	26	U	26	26	U	26	27	U	27	28	U	28	26	U	26
2-Chloronaphthalene	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
2-Chlorophenol	SVOA	20	U	20	19	U	19	20	U	20	21	U	21	20	U	20
2-Methylnaphthalene	SVOA	18	U	18	18	U	18	18	U	18	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	12	U	12	12	U	12	12	U	12	13	U	13	12	U	12
2-Nitroaniline	SVOA	47	U	47	46	U	46	48	U	48	49	U	49	47	U	47
2-Nitrophenol	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
3,3'-Dichlorobenzidine	SVOA	85	U	85	83	U	83	86	U	86	89	U	89	84	U	85
3+4 Methylphenol (cresol, m+p)	SVOA	31	U	31	31	U	31	32	U	32	32	U	32	31	U	31
3-Nitroaniline	SVOA	69	U	69	67	U	67	70	U	70	72	U	72	68	U	69
4,6-Dinitro-2-methylphenol	SVOA	310	U	310	310	U	310	320	U	320	320	U	320	310	U	310
4-Bromophenylphenyl ether	SVOA	18	U	18	18	U	18	18	U	18	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	62	U	62	61	U	61	63	U	63	65	U	65	62	U	62
4-Chloroaniline	SVOA	77	U	77	76	U	76	78	U	78	81	U	81	77	U	77
4-Chlorophenylphenyl ether	SVOA	20	U	20	19	U	19	20	U	20	21	U	21	20	U	20
4-Nitroaniline	SVOA	69	U	69	67	U	67	69	U	69	71	U	71	68	U	69
4-Nitrophenol	SVOA	92	U	92	90	U	90	93	U	93	96	U	96	91	U	92

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-10 resample 1[a] J1KNL0			SX-11 J1K3V3			Equipment Blank J1K3W5			SPA-1 J1K3R4			Duplicate of J1K3R4 J1K3T0		
		8/10/2011			7/5/2011			7/5/2011			6/29/2011			6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	9.7	U	9.7	9.5	U	9.5	9.9	U	9.9	10	U	10	9.6	U	9.7
Acenaphthylene	SVOA	16	U	16	16	U	16	16	U	16	17	U	17	16	U	16
Anthracene	SVOA	16	U	16	16	U	16	16	U	16	17	U	17	16	U	16
Benzo(a)anthracene	SVOA	19	U	19	53	J	18	19	U	19	20	U	20	19	U	19
Benzo(a)pyrene	SVOA	19	U	19	40	J	18	19	U	19	20	U	20	19	U	19
Benzo(b)fluoranthene	SVOA	25	U	25	68	J	24	25	U	25	29	JK	26	28	JK	25
Benzo(ghi)perylene	SVOA	15	U	15	22	J	15	15	U	15	16	U	16	15	U	15
Benzo(k)fluoranthene	SVOA	38	U	38	37	U	37	38	U	38	39	UK	39	37	UK	38
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	21	U	21	22	U	22	23	U	23	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	21	U	21	22	U	22	23	U	23	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	15	U	15	16	U	16	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	43	U	43	43	U	43	44	U	44	660	U	45	660	U	43
Butylbenzylphthalate	SVOA	41	U	41	40	U	40	41	U	41	42	U	42	40	U	41
Carbazole	SVOA	34	U	34	33	U	33	35	U	35	35	U	35	34	U	34
Chrysene	SVOA	26	U	26	57	J	25	26	U	26	27	U	27	25	U	26
Dibenz[a,h]anthracene	SVOA	18	U	18	18	U	18	18	U	18	19	U	19	18	U	18
Dibenzofuran	SVOA	19	U	19	18	U	18	19	U	19	20	U	20	19	U	19
Diethyl phthalate	SVOA	25	U	25	24	U	24	25	U	25	26	U	26	24	U	25
Dimethyl phthalate	SVOA	22	U	22	21	U	21	22	U	22	23	U	23	22	U	22
Di-n-butylphthalate	SVOA	27	U	27	27	U	27	28	U	28	29	U	29	27	U	27
Di-n-octylphthalate	SVOA	14	U	14	13	U	13	14	U	14	14	U	14	13	U	14
Fluoranthene	SVOA	34	U	34	110	J	33	35	U	35	35	U	35	34	U	34
Fluorene	SVOA	17	U	17	17	U	17	17	U	17	18	U	18	17	U	17
Hexachlorobenzene	SVOA	27	U	27	27	U	27	28	U	28	29	U	29	27	U	27
Hexachlorobutadiene	SVOA	9.5	U	9.5	9.2	U	9.2	9.6	U	9.6	9.8	U	9.8	9.4	U	9.5
Hexachlorocyclopentadiene	SVOA	47	U	47	46	U	46	48	U	48	49	U	49	47	U	47
Hexachloroethane	SVOA	20	U	20	20	U	20	20	U	20	21	U	21	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	21	U	21	20	U	20	21	U	21	22	U	22	21	U	21
Isophorone	SVOA	16	U	16	16	U	16	16	U	16	17	U	17	16	U	16
Naphthalene	SVOA	29	U	29	29	U	29	30	U	30	31	U	31	29	U	29
Nitrobenzene	SVOA	21	U	21	20	U	20	21	U	21	22	U	22	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	29	U	29	29	U	29	30	U	30	31	U	31	29	U	29
N-Nitrosodiphenylamine	SVOA	20	U	20	19	U	19	20	U	20	21	U	21	20	U	20
Pentachlorophenol	SVOA	310	U	310	310	U	310	320	U	320	320	U	320	310	U	310
Phenanthrene	SVOA	16	U	16	67	J	16	16	U	16	19	J	17	23	J	16
Phenol	SVOA	17	U	17	17	U	17	33	J	17	18	U	18	17	U	17
Pyrene	SVOA	11	U	11	110	J	11	12	U	12	28	J	12	33	J	11

Attachment	1	Sheet No.	18 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-8 J1K3V7 7/5/2011			Duplicate of J1K3V7 J1K3W4 7/5/2011			SPA-2 J1K3R5 6/29/2011			SPA-3 J1K3R6 6/29/2011			SPA-4 J1K3R7 6/29/2011		
		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	11	U	11	9.5	U	9.5	9.6	U	9.6	9.3	U	9.3
Acenaphthylene	PAH	8.6	U	8.6	9.9	U	9.9	8.5	U	8.5	8.7	U	8.7	8.4	U	8.4
Anthracene	PAH	7.5	JX	2.9	26		3.3	2.9	U	2.9	2.9	U	2.9	2.8	U	2.8
Benzo(a)anthracene	PAH	62	X	3.0	110		3.5	3.0	U	3.0	3.1	U	3.1	3.0	U	3.0
Benzo(a)pyrene	PAH	46		6.1	86		7.0	6.1	U	6.1	22		6.2	12	J	6.0
Benzo(b)fluoranthene	PAH	37	X	4.0	62		4.6	4.0	U	4.0	4.0	U	4.0	3.9	U	3.9
Benzo(ghi)perylene	PAH	27	J	6.9	21	JX	7.9	6.8	U	6.8	6.9	U	6.9	9.8	J	6.7
Benzo(k)fluoranthene	PAH	19		3.8	43		4.3	3.7	U	3.7	3.8	U	3.8	3.7	U	3.7
Chrysene	PAH	57		4.6	100		5.3	8.5	J	4.6	4.7	U	4.7	4.5	U	4.5
Dibenz[a,h]anthracene	PAH	11	U	11	12	U	12	10	U	10	11	U	11	10	U	10
Fluoranthene	PAH	110		12	200		14	12	U	12	13	U	13	15	JX	12
Fluorene	PAH	5.0	U	5.0	16	J	5.8	5.0	U	5.0	5.1	U	5.1	4.9	U	4.9
Indeno(1,2,3-cd)pyrene	PAH	28	J	11	49		13	11	U	11	12	U	12	14	J	11
Naphthalene	PAH	11	U	11	13	U	13	11	U	11	12	U	12	11	U	11
Phenanthrene	PAH	39		11	93		13	11	U	11	12	U	12	11	U	11
Pyrene	PAH	130		11	160	X	13	11	U	11	12	U	12	18	JX	11
Aroclor-1016	PCB	2.6	U	2.6	3.0	U	3.0	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6
Aroclor-1221	PCB	7.6	U	7.6	8.8	U	8.8	7.5	U	7.5	7.6	U	7.6	7.5	U	7.5
Aroclor-1232	PCB	1.9	U	1.9	2.2	U	2.2	1.9	U	1.9	1.9	U	1.9	1.9	U	1.9
Aroclor-1242	PCB	4.4	U	4.4	5.1	U	5.1	4.3	U	4.3	4.4	U	4.4	4.3	U	4.3
Aroclor-1248	PCB	4.4	U	4.4	6.6	JP	5.1	4.3	U	4.3	4.4	U	4.4	4.3	U	4.3
Aroclor-1254	PCB	7.9	J	2.5	2.8	U	2.8	2.4	U	2.4	2.5	U	2.5	2.4	U	2.4
Aroclor-1260	PCB	2.5	U	2.5	2.8	U	2.8	6.1	J	2.4	4.1	J	2.5	2.4	U	2.4
Aldrin	PEST	0.23	U	0.23	0.28	U	0.28	2.3	UD	2.3	2.3	UD	2.3	0.23	U	0.23
Alpha-BHC	PEST	0.20	U	0.20	0.24	U	0.24	2.0	UD	2.0	2.0	UD	2.0	0.20	U	0.20
alpha-Chlordane	PEST	0.30	U	0.30	0.36	U	0.36	3.0	UD	3.0	3.0	UD	3.0	0.30	U	0.30
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	0.61	U	0.61	0.74	U	0.74	6.1	UD	6.1	6.1	UD	6.1	0.61	U	0.61
Delta-BHC	PEST	0.37	U	0.37	0.45	U	0.45	3.7	UD	3.7	3.7	UD	3.7	0.37	U	0.37
Dichlorodiphenyldichloroethane	PEST	0.50	U	0.50	0.61	U	0.61	5.0	UD	5.0	5.0	UD	5.0	0.50	U	0.50
Dichlorodiphenyldichloroethylene	PEST	0.22	U	0.22	0.27	U	0.27	2.2	UD	2.2	2.2	UD	2.2	0.22	U	0.22
Dichlorodiphenyltrichloroethane	PEST	0.54	U	0.54	0.66	U	0.66	5.4	UD	5.4	5.4	UD	5.4	0.55	U	0.55
Dieldrin	PEST	0.19	U	0.19	0.23	U	0.23	3.0	JD	1.9	2.1	JXD	1.9	0.19	U	0.19
Endosulfan I	PEST	0.16	U	0.16	0.20	U	0.20	1.6	UD	1.6	1.6	UD	1.6	0.16	U	0.16
Endosulfan II	PEST	0.26	U	0.26	0.32	U	0.32	2.6	UD	2.6	2.6	UD	2.6	0.27	U	0.27
Endosulfan sulfate	PEST	0.25	U	0.25	0.31	U	0.31	2.5	UD	2.5	2.5	UD	2.5	0.26	U	0.26
Endrin	PEST	0.28	U	0.28	0.34	U	0.34	2.8	UD	2.8	2.8	UD	2.8	0.28	U	0.28
Endrin aldehyde	PEST	0.16	U	0.16	0.19	U	0.19	1.6	UD	1.6	1.6	UD	1.6	0.16	U	0.16
Endrin ketone	PEST	0.45	U	0.45	0.55	U	0.55	4.5	UD	4.5	4.5	UD	4.5	0.45	U	0.45
Gamma-BHC (Lindane)	PEST	0.43	U	0.43	0.52	U	0.52	4.2	UD	4.2	4.3	UD	4.3	0.43	U	0.43
gamma-Chlordane	PEST	0.25	U	0.25	0.30	U	0.30	2.4	UD	2.4	2.4	UD	2.4	0.25	U	0.25
Heptachlor	PEST	0.20	U	0.20	0.24	U	0.24	2.0	UD	2.0	2.0	UD	2.0	0.20	U	0.20
Heptachlor epoxide	PEST	0.39	U	0.39	0.48	U	0.48	3.9	UD	3.9	3.9	UD	3.9	0.39	U	0.39
Methoxychlor	PEST	0.42	U	0.42	0.50	U	0.50	4.1	UD	4.1	4.1	UD	4.1	0.42	U	0.42
Toxaphene	PEST	15	U	15	18	U	18	140	UDJ	140	150	UDJ	150	15	UJ	15
1,2,4-Trichlorobenzene	SVOA	28	U	28	31	U	31	27	U	27	27	U	27	27	U	27
1,2-Dichlorobenzene	SVOA	22	U	22	24	U	24	21	U	21	21	U	21	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	13	U	13	12	U	12	11	U	11	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	15	U	15	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
2,4-Dichlorophenol	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
2,4-Dimethylphenol	SVOA	65	U	65	73	U	73	64	U	64	63	U	63	63	U	63
2,4-Dinitrophenol	SVOA	330	U	330	370	U	370	320	U	320	320	U	320	320	U	320
2,4-Dinitrotoluene	SVOA	65	U	65	73	U	73	64	U	64	63	U	63	63	U	63
2,6-Dinitrotoluene	SVOA	28	U	28	31	U	31	27	U	27	27	U	27	27	U	27
2-Chloronaphthalene	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
2-Chlorophenol	SVOA	21	U	21	23	U	23	20	U	20	20	U	20	20	U	20
2-Methylnaphthalene	SVOA	19	U	19	21	U	21	19	U	19	18	U	18	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	14	U	14	13	U	13	12	U	12	12	U	12
2-Nitroaniline	SVOA	49	U	49	55	U	55	49	U	49	48	U	48	48	U	48
2-Nitrophenol	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
3,3'-Dichlorobenzidine	SVOA	89	U	89	100	U	100	88	U	88	86	U	86	86	U	86
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	37	U	37	32	U	32	32	U	32	32	U	32
3-Nitroaniline	SVOA	72	U	72	81	U	81	71	U	71	70	U	70	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	370	U	370	320	U	320	320	U	320	320	U	320
4-Bromophenylphenyl ether	SVOA	19	U	19	21	U	21	19	U	19	18	U	18	18	U	18
4-Chloro-3-methylphenol	SVOA	65	U	65	73	U	73	64	U	64	63	U	63	63	U	63
4-Chloroaniline	SVOA	81	U	81	91	U	91	80	U	80	78	U	78	79	U	79
4-Chlorophenylphenyl ether	SVOA	21	U	21	23	U	23	20	U	20	20	U	20	20	U	20
4-Nitroaniline	SVOA	71	U	71	80	U	80	71	U	71	69	U	69	70	U	70
4-Nitrophenol	SVOA	95	U	95	110	U	110	95	U	95	93	U	93	93	U	93

Attachment	1	Sheet No.	19 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-8 J1K3V7			Duplicate of J1K3V7 J1K3W4			SPA-2 J1K3R5			SPA-3 J1K3R6			SPA-4 J1K3R7		
		7/5/2011			7/5/2011			6/29/2011			6/29/2011			6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	10	U	10	11	U	11	10	U	10	9.9	U	9.9	9.9	U	9.9
Acenaphthylene	SVOA	17	U	17	19	U	19	17	U	17	16	U	16	16	U	16
Anthracene	SVOA	17	U	17	19	J	19	17	U	17	16	U	16	16	U	16
Benzo(a)anthracene	SVOA	49	J	20	98	J	22	19	U	19	19	U	19	19	U	19
Benzo(a)pyrene	SVOA	41	J	20	79	J	22	19	U	19	19	U	19	19	U	19
Benzo(b)fluoranthene	SVOA	72	JK	26	140	JK	29	26	U	26	25	U	25	25	U	25
Benzo(ghi)perylene	SVOA	24	J	16	43	J	18	16	U	16	15	U	15	15	U	15
Benzo(k)fluoranthene	SVOA	39	UK	39	44	UK	44	39	U	39	38	U	38	38	U	38
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	25	U	25	22	U	22	22	U	22	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	25	U	25	22	U	22	22	U	22	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	18	U	18	16	U	16	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	45	U	45	51	U	51	660	U	45	660	U	44	660	U	44
Butylbenzylphthalate	SVOA	42	U	42	48	U	48	42	U	42	41	U	41	41	U	41
Carbazole	SVOA	35	U	35	40	U	40	35	U	35	34	U	34	35	U	35
Chrysene	SVOA	52	J	27	110	J	30	26	U	26	26	U	26	26	U	26
Dibenz[a,h]anthracene	SVOA	19	U	19	21	U	21	19	U	19	18	U	18	18	U	18
Dibenzofuran	SVOA	20	U	20	22	U	22	19	U	19	19	U	19	19	U	19
Diethyl phthalate	SVOA	26	U	26	29	U	29	25	U	25	25	U	25	25	U	25
Dimethyl phthalate	SVOA	23	U	23	25	U	25	22	U	22	22	U	22	22	U	22
Di-n-butylphthalate	SVOA	29	U	29	32	U	32	28	U	28	28	U	28	28	U	28
Di-n-octylphthalate	SVOA	66	JB	14	16	U	16	14	U	14	14	U	14	14	U	14
Fluoranthene	SVOA	84	J	35	200	J	40	35	U	35	34	U	34	35	U	35
Fluorene	SVOA	18	U	18	20	U	20	18	U	18	17	U	17	17	U	17
Hexachlorobenzene	SVOA	29	U	29	32	U	32	28	U	28	28	U	28	28	U	28
Hexachlorobutadiene	SVOA	9.8	U	9.8	11	U	11	9.7	U	9.7	9.6	U	9.6	9.6	U	9.6
Hexachlorocyclopentadiene	SVOA	49	U	49	55	U	55	49	U	49	48	U	48	48	U	48
Hexachloroethane	SVOA	21	U	21	24	U	24	21	U	21	20	U	20	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	40	J	24	21	U	21	21	U	21	21	U	21
Isophorone	SVOA	17	U	17	19	U	19	17	U	17	16	U	16	16	U	16
Naphthalene	SVOA	30	U	30	34	U	34	30	U	30	30	U	30	30	U	30
Nitrobenzene	SVOA	22	U	22	24	U	24	21	U	21	21	U	21	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	34	U	34	30	U	30	30	U	30	30	U	30
N-Nitrosodiphenylamine	SVOA	21	U	21	23	U	23	20	U	20	20	U	20	20	U	20
Pentachlorophenol	SVOA	320	U	320	370	U	370	320	U	320	320	U	320	320	U	320
Phenanthrene	SVOA	34	J	17	110	J	19	17	U	17	16	U	16	16	U	16
Phenol	SVOA	80	J	18	31	J	20	18	U	18	17	U	17	17	U	17
Pyrene	SVOA	91	J	12	210	J	13	17	J	12	12	U	12	12	U	12

Attachment	1	Sheet No.	20 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-5 J1K3R8			SPA-6 J1K3R9			SPA-7 resample 3[a] J1L863			SPA-9 J1K3V8			SPA-10 resample 1[a] J1KNK4		
		6/29/2011			7/5/2011			9/6/2011			7/5/2011			8/9/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.7	U	9.7	9.7	U	9.7	10	U	10	9.7	U	9.7	9.4	U	9.4
Acenaphthylene	PAH	8.7	U	8.7	8.8	U	8.8	9.0	U	9.0	8.7	U	8.7	8.4	U	8.4
Anthracene	PAH	3.0	U	3.0	3.0	U	3.0	3.1	U	3.1	11	J	3.0	14	J	2.9
Benzo(a)anthracene	PAH	3.1	U	3.1	16		3.1	3.2	U	3.2	54		3.1	65		3.0
Benzo(a)pyrene	PAH	10	J	6.2	20		6.2	6.4	U	6.4	42		6.2	60		6.0
Benzo(b)fluoranthene	PAH	4.1	U	4.1	26	X	4.1	4.2	U	4.2	29		4.1	38		3.9
Benzo(ghi)perylene	PAH	7.0	U	7.0	7.3	JX	7.0	7.2	U	7.2	14	J	7.0	15	J	6.7
Benzo(k)fluoranthene	PAH	3.8	U	3.8	9.1	J	3.8	3.9	U	3.9	22		3.8	24		3.7
Chrysene	PAH	4.7	U	4.7	39		4.7	4.8	U	4.8	47		4.7	62		4.5
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	11	U	11	10	U	10
Fluoranthene	PAH	17	J	13	44		13	13	U	13	95		13	120		12
Fluorene	PAH	5.1	U	5.1	5.1	U	5.1	5.3	U	5.3	5.1	U	5.1	10	J	4.9
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	20	J	12	12	U	12	23	J	12	31		11
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12	11	U	11
Phenanthrene	PAH	12	U	12	20	J	12	12	U	12	40		12	49		11
Pyrene	PAH	15	JX	12	34	JX	12	12	U	12	110		12	150		11
Aroclor-1016	PCB	2.5	U	2.5	2.7	U	2.7				2.7	U	2.7	2.7	U	2.7
Aroclor-1221	PCB	7.4	U	7.4	7.7	U	7.7				7.7	U	7.7	7.7	U	7.7
Aroclor-1232	PCB	1.8	U	1.8	1.9	U	1.9				1.9	U	1.9	1.9	U	1.9
Aroclor-1242	PCB	4.3	U	4.3	4.5	U	4.5				4.5	U	4.5	4.5	U	4.5
Aroclor-1248	PCB	4.3	U	4.3	4.5	U	4.5				4.5	U	4.5	8.8	JP	4.5
Aroclor-1254	PCB	17		2.4	19		2.5				5.6	JP	2.5	2.5	U	2.5
Aroclor-1260	PCB	8.2	JP	2.4	22		2.5				2.5	U	2.5	2.5	U	2.5
Aldrin	PEST	2.3	UD	2.3	2.4	UD	2.4				0.25	U	0.25	0.23	U	0.23
Alpha-BHC	PEST	2.0	UD	2.0	2.1	UD	2.1				0.21	U	0.21	0.20	U	0.20
alpha-Chlordane	PEST	3.0	UD	3.0	3.1	UD	3.1				0.81	J	0.32	0.67	J	0.3
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	6.1	UD	6.1	6.4	UD	6.4				0.65	U	0.65	0.62	U	0.62
Delta-BHC	PEST	3.7	UD	3.7	3.9	UD	3.9				0.39	U	0.39	0.38	U	0.38
Dichlorodiphenyldichloroethane	PEST	5.0	UD	5.0	5.3	UD	5.3				0.54	U	0.54	0.51	U	0.51
Dichlorodiphenyldichloroethylene	PEST	2.2	UD	2.2	2.3	UD	2.3				0.23	U	0.23	0.22	U	0.22
Dichlorodiphenyltrichloroethane	PEST	5.4	UD	5.4	5.7	UD	5.7				0.58	U	0.58	0.55	U	0.55
Dieldrin	PEST	1.9	UD	1.9	2.0	UD	2.0				0.21	U	0.21	0.20	U	0.20
Endosulfan I	PEST	1.6	UD	1.6	1.7	UD	1.7				0.17	U	0.17	0.16	U	0.16
Endosulfan II	PEST	2.6	UD	2.6	2.8	UD	2.8				0.28	U	0.28	0.27	U	0.27
Endosulfan sulfate	PEST	2.5	UD	2.5	2.7	UD	2.7				0.27	U	0.27	0.26	U	0.26
Endrin	PEST	2.8	UD	2.8	3.0	UD	3.0				0.30	U	0.30	0.29	U	0.29
Endrin aldehyde	PEST	1.6	UD	1.6	1.7	UD	1.7				0.17	U	0.17	0.16	U	0.16
Endrin ketone	PEST	4.5	UD	4.5	4.7	UD	4.7				0.48	U	0.48	0.46	U	0.46
Gamma-BHC (Lindane)	PEST	4.3	UD	4.3	4.5	UD	4.5				0.46	U	0.46	0.43	U	0.43
gamma-Chlordane	PEST	2.4	UD	2.4	2.6	UD	2.6				0.91	J	0.26	0.81	JX	0.25
Heptachlor	PEST	2.0	UD	2.0	2.1	UD	2.1				0.21	U	0.21	0.20	U	0.20
Heptachlor epoxide	PEST	3.9	UD	3.9	4.1	UD	4.1				0.42	U	0.42	0.40	U	0.40
Methoxychlor	PEST	4.1	UD	4.1	4.4	UD	4.4				0.44	U	0.44	0.42	U	0.42
Toxaphene	PEST	150	UDJ	150	150	UDJ	150				16	U	16	15	U	15
1,2,4-Trichlorobenzene	SVOA	28	U	28	26	U	26	27	U	27	28	U	28	26	U	26
1,2-Dichlorobenzene	SVOA	22	U	22	21	U	21	21	U	21	22	U	22	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	11	U	11	12	U	12	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	14	U	14	13	U	13	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
2,4,6-Trichlorophenol	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
2,4-Dichlorophenol	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
2,4-Dimethylphenol	SVOA	66	U	66	62	U	62	63	U	63	65	U	65	62	U	62
2,4-Dinitrophenol	SVOA	330	U	330	310	U	310	320	U	320	330	U	330	310	U	310
2,4-Dinitrotoluene	SVOA	66	U	66	62	U	62	63	U	63	65	U	65	62	U	62
2,6-Dinitrotoluene	SVOA	28	U	28	26	U	26	27	U	27	28	U	28	26	U	26
2-Chloronaphthalene	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
2-Chlorophenol	SVOA	21	U	21	20	U	20	20	U	20	21	U	21	20	U	20
2-Methylnaphthalene	SVOA	19	U	19	18	U	18	18	U	18	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	12	U	12	12	U	12	13	U	13	12	U	12
2-Nitroaniline	SVOA	50	U	50	47	U	47	48	U	48	49	U	49	47	U	47
2-Nitrophenol	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
3,3'-Dichlorobenzidine	SVOA	90	U	90	85	U	85	86	U	86	88	U	88	84	U	84
3+4 Methylphenol (cresol, m+p)	SVOA	33	U	33	31	U	31	32	U	32	32	U	32	31	U	31
3-Nitroaniline	SVOA	73	U	73	69	U	69	70	U	70	72	U	72	68	U	68
4,6-Dinitro-2-methylphenol	SVOA	330	U	330	310	U	310	320	U	320	320	U	320	310	U	310
4-Bromophenylphenyl ether	SVOA	19	U	19	18	U	18	18	U	18	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	66	U	66	62	U	62	63	U	63	65	U	65	62	U	62
4-Chloroaniline	SVOA	82	U	82	77	U	77	79	U	79	80	U	80	77	U	77
4-Chlorophenylphenyl ether	SVOA	21	U	21	20	U	20	20	U	20	21	U	21	20	U	20
4-Nitroaniline	SVOA	72	U	72	69	U	69	70	U	70	71	U	71	68	U	68
4-Nitrophenol	SVOA	97	U	97	92	U	92	93	U	93	95	U	95	91	U	91

Attachment	1	Sheet No.	21 of 36
Originator	N. Kobayashi	Date	10/03/11
Checked	J. D. Skoglie	Date	10/03/11
Calc. No.	0100F-CA-V0392	Rev. No.	1

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-5 J1K3R8 6/29/2011			SPA-6 J1K3R9 7/5/2011			SPA-7 resample 3[a] J1L863 9/6/2011			SPA-9 J1K3V8 7/5/2011			SPA-10 resample 1[a] J1KNK4 8/9/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	10	U	10	9.7	U	9.7	9.9	U	9.9	10	U	10	9.6	U	9.6
Acenaphthylene	SVOA	17	U	17	16	U	16	16	U	16	17	U	17	16	U	16
Anthracene	SVOA	17	U	17	16	U	16	16	U	16	17	U	17	16	U	16
Benzo(a)anthracene	SVOA	20	J	20	19	U	19	19	U	19	29	J	20	34	J	19
Benzo(a)pyrene	SVOA	20	J	20	19	U	19	19	U	19	24	J	20	24	J	19
Benzo(b)fluoranthene	SVOA	35	JK	26	33	JK	25	25	U	25	44	JK	26	46	J	25
Benzo(ghi)perylene	SVOA	17	J	16	15	U	15	15	U	15	16	J	16	19	J	15
Benzo(k)fluoranthene	SVOA	40	UK	40	38	UK	38	38	U	38	39	UK	39	37	U	37
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	22	U	22	22	U	22	23	U	23	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	22	U	22	16	U	16	23	U	23	22	U	22
Bis(2-chloroethyl) ether	SVOA	17	U	17	16	U	16	22	U	22	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	660	U	46	660	U	44	70	U	44	45	U	45	69	JB	43
Butylbenzylphthalate	SVOA	43	U	43	41	U	41	41	U	41	42	U	42	40	U	40
Carbazole	SVOA	36	U	36	34	U	34	35	U	35	35	U	35	34	U	34
Chrysene	SVOA	27	U	27	26	U	26	26	U	26	32	J	27	32	J	25
Dibenz[a,h]anthracene	SVOA	19	U	19	18	U	18	18	U	18	19	U	19	18	U	18
Dibenzofuran	SVOA	20	U	20	19	U	19	19	U	19	20	U	20	19	U	19
Diethyl phthalate	SVOA	26	U	26	25	U	25	25	U	25	26	U	26	24	U	24
Dimethyl phthalate	SVOA	23	U	23	22	U	22	22	U	22	23	U	23	22	U	22
Di-n-butylphthalate	SVOA	29	U	29	27	U	27	28	U	28	28	U	28	27	U	27
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	68	J	14	14	U	14	13	U	13
Fluoranthene	SVOA	41	J	36	34	U	34	35	U	35	47	J	35	51	J	34
Fluorene	SVOA	18	U	18	17	U	17	17	U	17	18	U	18	17	U	17
Hexachlorobenzene	SVOA	29	U	29	27	U	27	28	U	28	28	U	28	27	U	27
Hexachlorobutadiene	SVOA	10	U	10	9.5	U	9.5	9.6	U	9.6	9.8	U	9.8	9.4	U	9.4
Hexachlorocyclopentadiene	SVOA	50	U	50	47	U	47	48	U	48	49	U	49	47	U	47
Hexachloroethane	SVOA	21	U	21	20	U	20	20	U	20	21	U	21	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	21	U	21	21	U	21	22	U	22	21	U	21
Isophorone	SVOA	17	U	17	16	U	16	16	U	16	17	U	17	16	U	16
Naphthalene	SVOA	31	U	31	29	U	29	30	U	30	30	U	30	29	U	29
Nitrobenzene	SVOA	22	U	22	21	U	21	21	U	21	22	U	22	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	31	U	31	29	U	29	30	U	30	30	U	30	29	U	29
N-Nitrosodiphenylamine	SVOA	21	U	21	20	U	20	20	U	20	21	U	21	20	U	20
Pentachlorophenol	SVOA	330	U	330	310	U	310	320	U	320	320	U	320	310	U	310
Phenanthrene	SVOA	26	J	17	16	U	16	16	U	16	21	J	17	22	J	16
Phenol	SVOA	18	U	18	17	U	17	17	U	17	33	J	18	17	U	17
Pyrene	SVOA	50	J	12	25	J	11	12	U	12	50	J	12	58	J	11

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Originator	N. Kobayashi	Date	10/03/11
Checked	J. D. Skoglie	Date	10/03/11
Calc. No.	0100F-CA-V0392	Rev. No.	1

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-11 J1K3W0 7/5/2011			SPA-12 J1K3W1 7/5/2011			SPA-13 J1K3W2 7/5/2011			SPA-14 J1K3W3 7/5/2011			NX-4 J1K3N5 6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.7	U	9.7	9.8	U	9.8	9.8	U	9.8	11	U	11	10	U	10
Acenaphthylene	PAH	8.7	U	8.7	8.8	U	8.8	8.9	U	8.9	10	U	10	9.0	U	9.0
Anthracene	PAH	3.0	U	3.0	3.0	U	3.0	5.0	J	3.0	5.0	J	3.5	3.1	U	3.1
Benzo(a)anthracene	PAH	3.1	U	3.1	3.1	U	3.1	25		3.1	38		3.6	3.2	U	3.2
Benzo(a)pyrene	PAH	6.2	U	6.2	6.3	U	6.3	16		6.3	27		7.3	18		6.4
Benzo(b)fluoranthene	PAH	4.1	U	4.1	4.1	U	4.1	14	J	4.1	24		4.8	20	X	4.2
Benzo(ghi)perylene	PAH	7.0	U	7.0	7.1	U	7.1	7.1	U	7.1	8.2	U	8.2	10	J	7.2
Benzo(k)fluoranthene	PAH	3.8	U	3.8	3.9	U	3.9	7.4	J	3.9	13	J	4.5	7.4	J	3.9
Chrysene	PAH	4.7	U	4.7	4.7	U	4.7	23	J	4.8	33	J	5.5	25	J	4.8
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	13	U	13	11	U	11
Fluoranthene	PAH	13	U	13	13	U	13	45		13	64		15	26	J	13
Fluorene	PAH	5.1	U	5.1	5.2	U	5.2	5.2	U	5.2	6.0	U	6.0	8.4	J	5.3
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	12	U	12	19	J	14	20	J	12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	14	U	14	12	U	12
Phenanthrene	PAH	12	U	12	12	U	12	20	J	12	21	J	14	13	J	12
Pyrene	PAH	12	U	12	12	U	12	35	JX	12	74		14	25	JX	12
Aroclor-1016	PCB	2.7	U	2.7	2.7	U	2.7	2.7	U	2.7	3.2	U	3.2	2.7	U	2.7
Aroclor-1221	PCB	7.9	U	7.9	7.9	U	7.9	7.7	U	7.7	9.2	U	9.2	7.7	U	7.7
Aroclor-1232	PCB	2.0	U	2.0	2.0	U	2.0	1.9	U	1.9	2.3	U	2.3	1.9	U	1.9
Aroclor-1242	PCB	4.6	U	4.6	4.6	U	4.6	4.5	U	4.5	5.4	U	5.4	4.5	U	4.5
Aroclor-1248	PCB	4.6	U	4.6	4.6	U	4.6	13	P	4.5	18	P	5.4	4.5	U	4.5
Aroclor-1254	PCB	2.6	U	2.6	2.6	U	2.6	2.5	U	2.5	3.0	U	3.0	2.5	U	2.5
Aroclor-1260	PCB	2.6	U	2.6	2.6	U	2.6	2.5	U	2.5	3.0	U	3.0	8.4	J	2.5
Aldrin	PEST	0.25	U	0.25	0.23	U	0.23	0.24	U	0.24	0.28	U	0.28	2.5	UD	2.5
Alpha-BHC	PEST	0.21	U	0.21	0.20	U	0.20	0.20	U	0.20	0.24	U	0.24	2.1	UD	2.1
alpha-Chlordane	PEST	0.32	U	0.32	0.30	U	0.30	0.66	J	0.31	0.36	U	0.36	3.2	UD	3.2
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	0.65	U	0.65	0.61	U	0.61	0.63	U	0.63	0.74	U	0.74	6.5	UD	6.5
Delta-BHC	PEST	0.39	U	0.39	0.37	U	0.37	0.38	U	0.38	0.45	U	0.45	4.0	UD	4.0
Dichlorodiphenyldichloroethane	PEST	0.54	U	0.54	0.50	U	0.50	0.52	U	0.52	0.61	U	0.61	5.4	UD	5.4
Dichlorodiphenyldichloroethylene	PEST	0.23	U	0.23	0.22	U	0.22	0.23	U	0.23	0.27	U	0.27	2.3	UD	2.3
Dichlorodiphenyltrichloroethane	PEST	0.58	U	0.58	0.54	U	0.54	0.56	U	0.56	0.66	U	0.66	5.8	UD	5.8
Dieldrin	PEST	0.21	U	0.21	0.19	U	0.19	0.2	U	0.2	0.24	U	0.24	75	D	2.1
Endosulfan I	PEST	0.17	U	0.17	0.16	U	0.16	0.17	U	0.17	0.20	U	0.20	1.7	UD	1.7
Endosulfan II	PEST	0.28	U	0.28	0.26	U	0.26	0.27	U	0.27	0.32	U	0.32	2.8	UD	2.8
Endosulfan sulfate	PEST	0.27	U	0.27	0.25	U	0.25	0.26	U	0.26	0.31	U	0.31	2.7	UD	2.7
Endrin	PEST	0.30	U	0.30	0.28	U	0.28	0.29	U	0.29	0.34	U	0.34	3.0	UD	3.0
Endrin aldehyde	PEST	0.17	U	0.17	0.16	U	0.16	0.16	U	0.16	0.19	U	0.19	1.7	UD	1.7
Endrin ketone	PEST	0.48	U	0.48	0.45	U	0.45	0.46	U	0.46	0.55	U	0.55	4.8	UD	4.8
Gamma-BHC (Lindane)	PEST	0.45	U	0.45	0.43	U	0.43	0.44	U	0.44	0.52	U	0.52	4.6	UD	4.6
gamma-Chlordane	PEST	0.26	U	0.26	0.24	U	0.24	0.67	J	0.25	0.30	U	0.30	2.6	UD	2.6
Heptachlor	PEST	0.21	U	0.21	0.20	U	0.20	0.20	U	0.20	0.24	U	0.24	2.1	UD	2.1
Heptachlor epoxide	PEST	0.42	U	0.42	0.39	U	0.39	0.40	U	0.40	0.48	U	0.48	4.2	UD	4.2
Methoxychlor	PEST	0.44	U	0.44	0.41	U	0.41	0.43	U	0.43	0.50	U	0.50	4.4	UD	4.4
Toxaphene	PEST	15	U	15	15	U	15	15	U	15	18	U	18	160	UD	160
1,2,4-Trichlorobenzene	SVOA	28	U	28	28	U	28	27	U	27	33	U	33	26	U	26
1,2-Dichlorobenzene	SVOA	22	U	22	22	U	22	21	U	21	26	U	26	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	12	U	12	12	U	12	14	U	14	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	13	U	13	16	U	16	13	U	13
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
2,4-Dichlorophenol	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
2,4-Dimethylphenol	SVOA	65	U	65	65	U	65	64	U	64	79	U	79	62	U	62
2,4-Dinitrophenol	SVOA	330	U	330	330	U	330	320	U	320	400	U	400	310	U	310
2,4-Dinitrotoluene	SVOA	65	U	65	65	U	65	64	U	64	79	U	79	62	U	62
2,6-Dinitrotoluene	SVOA	28	U	28	28	U	28	27	U	27	33	U	33	26	U	26
2-Chloronaphthalene	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
2-Chlorophenol	SVOA	21	U	21	21	U	21	20	U	20	25	U	25	20	U	20
2-Methylnaphthalene	SVOA	19	U	19	19	U	19	18	U	18	23	U	23	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	13	U	13	13	U	13	16	U	16	12	U	12
2-Nitroaniline	SVOA	49	U	49	49	U	49	48	U	48	60	U	60	47	U	47
2-Nitrophenol	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
3,3'-Dichlorobenzidine	SVOA	89	U	89	89	U	89	87	U	87	110	U	110	84	U	84
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	33	U	33	32	U	32	39	U	39	31	U	31
3-Nitroaniline	SVOA	72	U	72	72	U	72	70	U	70	87	U	87	68	U	68
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	330	U	330	320	U	320	390	U	390	310	U	310
4-Bromophenylphenyl ether	SVOA	19	U	19	19	U	19	18	U	18	23	U	23	18	U	18
4-Chloro-3-methylphenol	SVOA	65	U	65	65	U	65	64	U	64	79	U	79	62	U	62
4-Chloroaniline	SVOA	81	U	81	81	U	81	79	U	79	98	U	98	77	U	77
4-Chlorophenylphenyl ether	SVOA	21	U	21	21	U	21	20	U	20	25	U	25	20	U	20
4-Nitroaniline	SVOA	71	U	71	72	U	72	70	U	70	87	U	87	68	U	68
4-Nitrophenol	SVOA	95	U	95	96	U	96	94	U	94	120	U	120	91	U	91

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-11 J1K3W0			SPA-12 J1K3W1			SPA-13 J1K3W2			SPA-14 J1K3W3			NX-4 J1K3N5		
		7/5/2011			7/5/2011			7/5/2011			7/5/2011			6/29/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	10	U	10	10	U	10	11	J	9.9	12	U	12	9.6	U	9.6
Acenaphthylene	SVOA	17	U	17	17	U	17	16	U	16	20	U	20	16	U	16
Anthracene	SVOA	17	U	17	17	U	17	22	J	16	20	U	20	16	U	16
Benzo(a)anthracene	SVOA	20	U	20	20	U	20	69	J	19	50	J	24	42	J	19
Benzo(a)pyrene	SVOA	20	U	20	20	U	20	51	J	19	39	J	24	42	J	19
Benzo(b)fluoranthene	SVOA	26	U	26	26	U	26	86	JK	25	71	JK	31	70	JK	25
Benzo(ghi)perylene	SVOA	16	U	16	16	U	16	25	J	15	22	J	19	25	J	15
Benzo(k)fluoranthene	SVOA	39	U	39	39	U	39	39	UK	39	48	UK	48	37	UK	37
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	23	U	23	22	U	22	27	U	27	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	23	U	23	22	U	22	27	U	27	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	16	U	16	16	U	16	20	U	20	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	45	U	45	45	U	45	44	U	44	55	U	55	69	JB	43
Butylbenzylphthalate	SVOA	42	U	42	42	U	42	42	U	42	51	U	51	40	U	40
Carbazole	SVOA	35	U	35	36	U	36	35	U	35	43	U	43	34	U	34
Chrysene	SVOA	27	U	27	27	U	27	72	J	26	55	J	32	55	J	25
Dibenz[a,h]anthracene	SVOA	19	U	19	19	U	19	18	U	18	23	U	23	18	U	18
Dibenzofuran	SVOA	20	U	20	20	U	20	19	U	19	24	U	24	19	U	19
Diethyl phthalate	SVOA	26	U	26	26	U	26	25	U	25	31	U	31	24	U	24
Dimethyl phthalate	SVOA	23	U	23	23	U	23	22	U	22	27	U	27	22	U	22
Di-n-butylphthalate	SVOA	29	U	29	29	U	29	28	U	28	35	U	35	27	U	27
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	14	U	14	17	U	17	13	U	13
Fluoranthene	SVOA	35	U	35	36	U	36	150	J	35	84	J	43	77	J	34
Fluorene	SVOA	18	U	18	18	U	18	17	U	17	21	U	21	17	U	17
Hexachlorobenzene	SVOA	29	U	29	29	U	29	28	U	28	35	U	35	27	U	27
Hexachlorobutadiene	SVOA	9.8	U	9.8	9.9	U	9.9	9.7	U	9.7	12	U	12	9.4	U	9.4
Hexachlorocyclopentadiene	SVOA	49	U	49	49	U	49	48	U	48	60	U	60	47	U	47
Hexachloroethane	SVOA	21	U	21	21	U	21	21	U	21	25	U	25	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	22	U	22	22	U	22	24	J	21	26	U	26	21	J	21
Isophorone	SVOA	17	U	17	17	U	17	16	U	16	20	U	20	16	U	16
Naphthalene	SVOA	30	U	30	31	U	31	30	U	30	37	U	37	29	U	29
Nitrobenzene	SVOA	22	U	22	22	U	22	21	U	21	26	U	26	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	31	U	31	30	U	30	37	U	37	29	U	29
N-Nitrosodiphenylamine	SVOA	21	U	21	21	U	21	20	U	20	25	U	25	20	U	20
Pentachlorophenol	SVOA	320	U	320	330	U	330	320	U	320	390	U	390	310	U	310
Phenanthrene	SVOA	17	U	17	17	U	17	100	J	16	31	J	20	36	J	16
Phenol	SVOA	64	J	18	33	J	18	26	J	17	52	J	21	17	U	17
Pyrene	SVOA	13	J	12	12	U	12	140	J	12	89	J	14	79	J	11

Attachment	1	Sheet No.	24 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-5 J1K3N6			NX-10 J1K3P1			SX-12 J1K3V4			Duplicate of J1K3V4 J1K3V5			SX-2 J1K3T4		
		6/29/2011			6/29/2011			7/5/2011			7/5/2011			7/5/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.9	U	9.9	9.6	U	9.6	9.8	U	9.8	9.8	U	9.8	9.9	U	9.9
Acenaphthylene	PAH	19	J	8.9	8.6	U	8.6	8.8	U	8.8	8.9	U	8.9	8.9	U	8.9
Anthracene	PAH	59	X	3.0	7.7	JX	2.9	28		3.0	31		3.0	90		3.0
Benzo(a)anthracene	PAH	220		3.2	59		3.1	160		3.1	130		3.1	280	XN	3.2
Benzo(a)pyrene	PAH	180		6.4	110		6.2	130		6.3	97	X	6.3	280		6.3
Benzo(b)fluoranthene	PAH	140	X	4.2	92	X	4.0	94	X	4.1	71		4.1	190		4.1
Benzo(ghi)perylene	PAH	80		7.1	21	JX	6.9	46		7.1	36		7.1	120		7.1
Benzo(k)fluoranthene	PAH	69		3.9	55		3.8	63		3.9	35		3.9	120		3.9
Chrysene	PAH	220		4.8	100		4.6	140		4.7	120		4.8	260		4.8
Dibenz[a,h]anthracene	PAH	21	JX	11	11	U	11	19	JX	11	11	UX	11	55	X	11
Fluoranthene	PAH	490		13	100		12	240		13	230		13	500	N	13
Fluorene	PAH	67		5.2	7.2	J	5.1	5.2	U	5.2	20	J	5.2	39		5.2
Indeno(1,2,3-cd)pyrene	PAH	120		12	53		12	69	X	12	53		12	140		12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	430		12	65		12	88		12	110		12	220		12
Pyrene	PAH	460		12	140		12	300		12	280		12	430		12
Aroclor-1016	PCB	2.7	U	2.7	2.7	U	2.7	2.8	U	2.8	2.7	U	2.7	2.8	U	2.8
Aroclor-1221	PCB	7.7	U	7.7	7.9	U	7.9	8.0	U	8.0	7.9	U	7.9	8.2	U	8.2
Aroclor-1232	PCB	1.9	U	1.9	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.5	U	4.5	4.6	U	4.6	4.6	U	4.6	4.6	U	4.6	4.8	U	4.8
Aroclor-1248	PCB	4.5	U	4.5	4.6	U	4.6	90		4.6	41		4.6	25		4.8
Aroclor-1254	PCB	2.5	U	2.5	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6	2.7	U	2.7
Aroclor-1260	PCB	2.5	U	2.5	25	P	2.6	4.2	JP	2.6	4.6	J	2.6	4.0	JP	2.7
Aldrin	PEST	2.5	UD	2.5	2.3	UD	2.3									
Alpha-BHC	PEST	2.1	UD	2.1	2.0	UD	2.0									
alpha-Chlordane	PEST	3.2	UD	3.2	22	D	3.0									
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	6.5	UD	6.5	6.1	UD	6.1									
Delta-BHC	PEST	3.9	UD	3.9	3.7	UD	3.7									
Dichlorodiphenyldichloroethane	PEST	5.3	UD	5.3	5.0	UD	5.0									
Dichlorodiphenyldichloroethylene	PEST	2.3	UD	2.3	2.2	UD	2.2									
Dichlorodiphenyltrichloroethane	PEST	5.8	UD	5.8	5.4	UD	5.4									
Dieldrin	PEST	2.1	UD	2.1	1.9	UD	1.9									
Endosulfan I	PEST	1.7	UD	1.7	1.6	UD	1.6									
Endosulfan II	PEST	2.8	UD	2.8	2.6	UD	2.6									
Endosulfan sulfate	PEST	2.7	UD	2.7	2.5	UD	2.5									
Endrin	PEST	3.0	UD	3.0	2.8	UD	2.8									
Endrin aldehyde	PEST	1.7	UD	1.7	1.6	UD	1.6									
Endrin ketone	PEST	4.8	UD	4.8	4.5	UD	4.5									
Gamma-BHC (Lindane)	PEST	4.5	UD	4.5	4.3	UD	4.3									
gamma-Chlordane	PEST	2.6	UD	2.6	20	D	2.5									
Heptachlor	PEST	2.1	UD	2.1	2.0	UD	2.0									
Heptachlor epoxide	PEST	4.2	UD	4.2	3.9	UD	3.9									
Methoxychlor	PEST	4.4	UD	4.4	4.1	UD	4.1									
Toxaphene	PEST	150	UD	150	150	UD	150									
1,2,4-Trichlorobenzene	SVOA	27	U	27	26	U	26	27	U	27	27	U	27	27	U	27
1,2-Dichlorobenzene	SVOA	21	U	21	21	U	21	21	U	21	21	U	21	21	U	21
1,3-Dichlorobenzene	SVOA	12	U	12	11	U	11	11	U	11	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
2,4-Dichlorophenol	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
2,4-Dimethylphenol	SVOA	64	U	64	62	U	62	63	U	63	63	U	63	63	U	63
2,4-Dinitrophenol	SVOA	330	U	330	310	U	310	320	U	320	320	U	320	320	U	320
2,4-Dinitrotoluene	SVOA	64	U	64	62	U	62	63	U	63	63	U	63	63	U	63
2,6-Dinitrotoluene	SVOA	27	U	27	26	U	26	27	U	27	27	U	27	27	U	27
2-Chloronaphthalene	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
2-Chlorophenol	SVOA	21	U	21	20	U	20	20	U	20	20	U	20	20	U	20
2-Methylnaphthalene	SVOA	44	J	19	18	U	18	18	U	18	18	U	18	18	U	18
2-Methylphenol (cresol, o-)	SVOA	13	U	13	12	U	12	12	U	12	13	U	13	12	U	12
2-Nitroaniline	SVOA	49	U	49	47	U	47	48	U	48	48	U	48	48	U	48
2-Nitrophenol	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
3,3'-Dichlorobenzidine	SVOA	88	U	88	84	U	84	86	U	86	87	U	87	86	U	86
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	31	U	31	32	U	32	32	U	32	31	U	31
3-Nitroaniline	SVOA	71	U	71	68	U	68	70	U	70	70	U	70	70	U	70
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	310	U	310	320	U	320	320	U	320	310	U	310
4-Bromophenylphenyl ether	SVOA	19	U	19	18	U	18	18	U	18	18	U	18	18	U	18
4-Chloro-3-methylphenol	SVOA	64	U	64	62	U	62	63	U	63	63	U	63	63	U	63
4-Chloroaniline	SVOA	80	U	80	77	U	77	78	U	78	79	U	79	78	U	78
4-Chlorophenylphenyl ether	SVOA	21	U	21	20	U	20	20	U	20	20	U	20	20	U	20
4-Nitroaniline	SVOA	71	U	71	68	U	68	69	U	69	70	U	70	69	U	69
4-Nitrophenol	SVOA	95	U	95	91	U	91	93	U	93	93	U	93	93	U	93

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	NX-5 J1K3N6 6/29/2011			NX-10 J1K3P1 6/29/2011			SX-12 J1K3V4 7/5/2011			Duplicate of J1K3V4 J1K3V5 7/5/2011			SX-2 J1K3T4 7/5/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	34	J	10	9.6	U	9.6	55	J	9.8	24	J	9.9	17	J	9.8
Acenaphthylene	SVOA	140	J	17	25	J	16	16	U	16	16	U	16	16	U	16
Anthracene	SVOA	200	J	17	22	J	16	85	J	16	41	J	16	30	J	16
Benzo(a)anthracene	SVOA	450		20	110	J	19	220	J	19	140	J	19	230	J	19
Benzo(a)pyrene	SVOA	380		20	160	J	19	170	J	19	110	J	19	210	J	19
Benzo(b)fluoranthene	SVOA	620	K	26	330	K	25	290	J	25	190	J	25	360	K	25
Benzo(ghi)perylene	SVOA	200	J	16	81	J	15	84	J	15	56	J	15	110	J	15
Benzo(k)fluoranthene	SVOA	39	UK	39	37	UK	37	38	U	38	38	U	38	38	UK	38
Bis(2-chloro-1-methylethyl)ether	SVOA	22	U	22	22	U	22	22	U	22	22	U	22	22	U	22
Bis(2-Chloroethoxy)methane	SVOA	22	U	22	22	U	22	22	U	22	22	U	22	22	U	22
Bis(2-chloroethyl) ether	SVOA	16	U	16	16	U	16	16	U	16	16	U	16	16	U	16
Bis(2-ethylhexyl) phthalate	SVOA	71	JB	45	75	JB	43	44	U	44	44	U	44	44	U	44
Butylbenzylphthalate	SVOA	42	U	42	40	U	40	41	U	41	41	U	41	41	U	41
Carbazole	SVOA	98	J	35	34	U	34	41	J	34	35	U	35	34	U	34
Chrysene	SVOA	480		26	180	J	25	260	J	26	150	J	26	260	J	26
Dibenz[a,h]anthracene	SVOA	72	J	19	23	J	18	18	U	18	18	U	18	18	U	18
Dibenzofuran	SVOA	83	J	20	19	U	19	19	U	19	19	U	19	19	U	19
Diethyl phthalate	SVOA	25	U	25	24	U	24	25	U	25	25	U	25	25	U	25
Dimethyl phthalate	SVOA	22	U	22	22	U	22	22	U	22	22	U	22	22	U	22
Di-n-butylphthalate	SVOA	28	U	28	32	J	27	180	J	28	28	U	28	28	U	28
Di-n-octylphthalate	SVOA	14	U	14	13	U	13	14	U	14	14	U	14	14	U	14
Fluoranthene	SVOA	1100		35	180	J	34	480		34	290	J	35	390		34
Fluorene	SVOA	170	J	18	23	J	17	31	J	17	17	U	17	17	U	17
Hexachlorobenzene	SVOA	28	U	28	27	U	27	28	U	28	28	U	28	28	U	28
Hexachlorobutadiene	SVOA	9.8	U	9.8	9.4	U	9.4	9.6	U	9.6	9.6	U	9.6	9.5	U	9.5
Hexachlorocyclopentadiene	SVOA	49	U	49	47	U	47	48	U	48	48	U	48	48	U	48
Hexachloroethane	SVOA	21	U	21	20	U	20	20	U	20	20	U	20	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	190	J	21	76	J	21	76	J	21	50	J	21	100	J	21
Isophorone	SVOA	17	U	17	16	U	16	16	U	16	16	U	16	16	U	16
Naphthalene	SVOA	70	J	30	29	U	29	30	U	30	30	U	30	30	U	30
Nitrobenzene	SVOA	21	U	21	21	U	21	21	U	21	21	U	21	21	U	21
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	29	U	29	30	U	30	30	U	30	30	U	30
N-Nitrosodiphenylamine	SVOA	21	U	21	20	U	20	20	U	20	20	U	20	20	U	20
Pentachlorophenol	SVOA	320	U	320	310	U	310	320	U	320	320	U	320	310	U	310
Phenanthrene	SVOA	1100		17	170	J	16	370		16	180	J	16	140	J	16
Phenol	SVOA	18	U	18	17	U	17	17	U	17	17	U	17	17	U	17
Pyrene	SVOA	1000		12	220	J	11	490		12	290	J	12	440		12

Attachment	1	Sheet No.	26 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-3 J1K3T5 7/5/2011			SX-6 J1K3T8 7/5/2011			SX-7 J1K3T9 7/5/2011			SX-9 J1K3V1 7/5/2011			SX-10 J1K3V2 7/5/2011		
		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	9.3	U	9.3	9.5	U	9.5	10	U	10	9.3	U	9.3
Acenaphthylene	PAH	9.0	U	9.0	8.4	U	8.4	8.5	U	8.5	9.0	U	9.0	8.3	U	8.3
Anthracene	PAH	63		3.0	46		2.8	100	X	2.9	340	X	3.1	21		2.8
Benzo(a)anthracene	PAH	250	X	3.2	180	X	3.0	410		3.0	2000	X	3.2	130		3.0
Benzo(a)pyrene	PAH	220		6.4	140		6.0	320		6.1	1700		6.4	110		5.9
Benzo(b)fluoranthene	PAH	180		4.2	100	X	3.9	250		4.0	1200		4.2	65		3.9
Benzo(ghi)perylene	PAH	130		7.2	48		6.7	150		6.8	470	X	7.2	37	X	6.7
Benzo(k)fluoranthene	PAH	96		3.9	68		3.7	160		3.7	720		4.0	44		3.7
Chrysene	PAH	220		4.8	160		4.5	360		4.6	1800		4.9	100		4.5
Dibenz[a,h]anthracene	PAH	64	X	11	18	JX	10	63	X	10	320	X	11	10	U	10
Fluoranthene	PAH	390		13	320		12	730		12	3400		13	190		12
Fluorene	PAH	5.3	U	5.3	16	J	4.9	69		5	230		5.3	7.6	J	4.9
Indeno(1,2,3-cd)pyrene	PAH	140		12	74		11	170		11	940		12	46		11
Naphthalene	PAH	12	U	12	11	U	11	11	U	11	12	U	12	11	U	11
Phenanthrene	PAH	110		12	150		11	390		11	1200		12	78		11
Pyrene	PAH	500		12	380		11	870		11	2800	X	12	230		11
Aroclor-1016	PCB	27	UD	27	2.6	U	2.6	2.8	U	2.8	2.6	U	2.6	27	UD	27
Aroclor-1221	PCB	78	UD	78	7.7	U	7.7	8.0	U	8.0	7.6	U	7.6	77	UD	77
Aroclor-1232	PCB	20	UD	20	1.9	U	1.9	2.0	U	2.0	1.9	U	1.9	19	UD	19
Aroclor-1242	PCB	46	UD	46	4.4	U	4.4	4.6	U	4.6	4.4	U	4.4	45	UD	45
Aroclor-1248	PCB	1200	D	46	23		4.4	42		4.6	65		4.4	750	D	45
Aroclor-1254	PCB	25	UD	25	2.5	U	2.5	2.6	U	2.6	2.5	U	2.5	25	UD	25
Aroclor-1260	PCB	25	UD	25	2.5	U	2.5	2.6	U	2.6	7.5	JP	2.5	25	UD	25
Aldrin	PEST															
Alpha-BHC	PEST															
alpha-Chlordane	PEST															
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST															
Delta-BHC	PEST															
Dichlorodiphenyldichloroethane	PEST															
Dichlorodiphenyldichloroethylene	PEST															
Dichlorodiphenyltrichloroethane	PEST															
Dieldrin	PEST															
Endosulfan I	PEST															
Endosulfan II	PEST															
Endosulfan sulfate	PEST															
Endrin	PEST															
Endrin aldehyde	PEST															
Endrin ketone	PEST															
Gamma-BHC (Lindane)	PEST															
gamma-Chlordane	PEST															
Heptachlor	PEST															
Heptachlor epoxide	PEST															
Methoxychlor	PEST															
Toxaphene	PEST															
1,2,4-Trichlorobenzene	SVOA	26	U	26	27	U	27	27	U	27	27	U	27	26	U	26
1,2-Dichlorobenzene	SVOA	20	U	20	22	U	22	21	U	21	21	U	21	20	U	20
1,3-Dichlorobenzene	SVOA	11	U	11	12	U	12	12	U	12	12	U	12	11	U	11
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	13	U	13	13	U	13	13	U	13
2,4,5-Trichlorophenol	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
2,4,6-Trichlorophenol	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
2,4-Dichlorophenol	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
2,4-Dimethylphenol	SVOA	61	U	61	65	U	65	64	U	64	64	U	64	61	U	61
2,4-Dinitrophenol	SVOA	310	U	310	330	U	330	320	U	320	320	U	320	310	U	310
2,4-Dinitrotoluene	SVOA	61	U	61	65	U	65	64	U	64	64	U	64	61	U	61
2,6-Dinitrotoluene	SVOA	26	U	26	27	U	27	27	U	27	27	U	27	26	U	26
2-Chloronaphthalene	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
2-Chlorophenol	SVOA	19	U	19	21	U	21	20	U	20	20	U	20	19	U	19
2-Methylnaphthalene	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	18	U	18
2-Methylphenol (cresol, o-)	SVOA	12	U	12	13	U	13	13	U	13	13	U	13	12	U	12
2-Nitroaniline	SVOA	46	U	46	49	U	49	48	U	48	49	U	49	46	U	46
2-Nitrophenol	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
3,3'-Dichlorobenzidine	SVOA	83	U	83	88	U	88	87	U	87	88	U	88	83	U	83
3+4 Methylphenol (cresol, m+p)	SVOA	31	U	31	32	U	32	32	U	32	32	U	32	30	U	30
3-Nitroaniline	SVOA	68	U	68	71	U	71	70	U	70	71	U	71	67	U	67
4,6-Dinitro-2-methylphenol	SVOA	310	U	310	320	U	320	320	U	320	320	U	320	300	U	300
4-Bromophenylphenyl ether	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	18	U	18
4-Chloro-3-methylphenol	SVOA	61	U	61	65	U	65	64	U	64	64	U	64	61	U	61
4-Chloroaniline	SVOA	76	U	76	80	U	80	79	U	79	80	U	80	76	U	76
4-Chlorophenylphenyl ether	SVOA	19	U	19	21	U	21	20	U	20	20	U	20	19	U	19
4-Nitroaniline	SVOA	67	U	67	71	U	71	70	U	70	71	U	71	67	U	67
4-Nitrophenol	SVOA	90	U	90	95	U	95	94	U	94	95	U	95	89	U	89

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Checked	J. D. Skoglie	Date	09/29/11
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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SX-3 J1K3T5			SX-6 J1K3T8			SX-7 J1K3T9			SX-9 J1K3V1			SX-10 J1K3V2		
		7/5/2011			7/5/2011			7/5/2011			7/5/2011			7/5/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	25	J	9.5	76	J	10	56	J	9.9	35	J	10	47	J	9.5
Acenaphthylene	SVOA	16	U	16	17	U	17	16	U	16	17	U	17	16	U	16
Anthracene	SVOA	41	J	16	110	J	17	93	J	16	63	J	17	62	J	16
Benzo(a)anthracene	SVOA	230	J	19	280	J	20	340		19	360		19	200	J	18
Benzo(a)pyrene	SVOA	220	J	19	220	J	20	260	J	19	330		19	150	J	18
Benzo(b)fluoranthene	SVOA	360	K	24	570	K	26	440	K	25	570	K	26	260	JK	24
Benzo(ghi)perylene	SVOA	110	J	16	110	J	16	130	J	15	180	J	16	76	J	15
Benzo(k)fluoranthene	SVOA	37	UK	37	39	UK	39	39	UK	39	39	UK	39	37	UK	37
Bis(2-chloro-1-methylethyl)ether	SVOA	21	U	21	23	U	23	22	U	22	22	U	22	21	U	21
Bis(2-Chloroethoxy)methane	SVOA	21	U	21	23	U	23	22	U	22	22	U	22	21	U	21
Bis(2-chloroethyl) ether	SVOA	15	U	15	16	U	16	16	U	16	16	U	16	15	U	15
Bis(2-ethylhexyl) phthalate	SVOA	43	U	43	45	U	45	44	U	44	45	U	45	42	U	42
Butylbenzylphthalate	SVOA	40	U	40	42	U	42	41	U	41	42	U	42	40	U	40
Carbazole	SVOA	33	U	33	50	J	35	40	J	35	35	U	35	33	U	33
Chrysene	SVOA	260	J	25	320		26	360		26	420		26	210	J	25
Dibenz[a,h]anthracene	SVOA	18	U	18	19	U	19	18	U	18	19	U	19	18	U	18
Dibenzofuran	SVOA	19	U	19	20	U	20	19	U	19	19	U	19	18	U	18
Diethyl phthalate	SVOA	24	U	24	25	U	25	25	U	25	25	U	25	24	U	24
Dimethyl phthalate	SVOA	21	U	21	23	U	23	22	U	22	22	U	22	21	U	21
Di-n-butylphthalate	SVOA	27	U	27	28	U	28	28	U	28	28	U	28	80	J	27
Di-n-octylphthalate	SVOA	13	U	13	14	U	14	14	U	14	14	U	14	13	U	13
Fluoranthene	SVOA	430		33	610		35	650		35	690		35	410		33
Fluorene	SVOA	17	U	17	39	J	18	27	J	17	18	U	18	22	J	17
Hexachlorobenzene	SVOA	27	U	27	28	U	28	28	U	28	28	U	28	27	U	27
Hexachlorobutadiene	SVOA	9.3	U	9.3	9.8	U	9.8	9.6	U	9.6	9.7	U	9.7	9.2	U	9.2
Hexachlorocyclopentadiene	SVOA	46	U	46	49	U	49	48	U	48	49	U	49	46	U	46
Hexachloroethane	SVOA	20	U	20	21	U	21	21	U	21	21	U	21	20	U	20
Indeno(1,2,3-cd)pyrene	SVOA	110	J	20	100	J	22	120	J	21	170	J	21	76	J	20
Isophorone	SVOA	16	U	16	17	U	17	16	U	16	17	U	17	16	U	16
Naphthalene	SVOA	29	U	29	30	U	30	30	U	30	30	U	30	29	U	29
Nitrobenzene	SVOA	20	U	20	22	U	22	21	U	21	21	U	21	20	U	20
N-Nitroso-di-n-dipropylamine	SVOA	29	U	29	30	U	30	30	U	30	30	U	30	29	U	29
N-Nitrosodiphenylamine	SVOA	19	U	19	21	U	21	20	U	20	20	U	20	19	U	19
Pentachlorophenol	SVOA	310	U	310	320	U	320	320	U	320	320	U	320	300	U	300
Phenanthrene	SVOA	180	J	16	450		17	390		16	300	J	17	280	J	16
Phenol	SVOA	17	U	17	18	U	18	17	U	17	18	U	18	17	U	17
Pyrene	SVOA	480		11	630		12	700		12	730		12	430		11

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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-7 J1K3V6 7/5/2011			SPA-7 resample 1* J1KNK3 8/9/2011			SPA-7 resample 2* J1KTJ6 8/23/2011			SPA-10 J1K3V9 7/5/2011			FS-1 J1KPJ9 8/16/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	PAH	9.8	U	9.8	9.4	U	9.4	10	U	10	10	U	10	10	U	10
Acenaphthylene	PAH	8.8	U	8.8	8.5	U	8.5	9.2	U	9.2	9.0	U	9.0	9.2	U	9.2
Anthracene	PAH	99	X	3.0	33	X	2.9	25	X	3.1	96		3.0	3.1	U	3.1
Benzo(a)anthracene	PAH	390		3.1	170		3.0	180		3.3	230		3.2	3.3	U	3.3
Benzo(a)pyrene	PAH	300		6.3	140		6.0	150		6.6	150		6.4	8.4	JX	6.5
Benzo(b)fluoranthene	PAH	250		4.1	110		4.0	150		4.3	100		4.2	4.7	JX	4.3
Benzo(ghi)perylene	PAH	140		7.0	28	X	6.8	61		7.4	50		7.2	7.3	U	7.3
Benzo(k)fluoranthene	PAH	150		3.9	55		3.7	53	X	4.0	71		3.9	6.3	J	4.0
Chrysene	PAH	370		4.7	160		4.6	170		5.0	190		4.8	6.7	J	4.9
Dibenz[a,h]anthracene	PAH	55	X	11	10	U	10	19	JX	11	14	JX	11	11	U	11
Fluoranthene	PAH	700		13	330		12	300		13	430		13	13	U	13
Fluorene	PAH	69		5.2	24	J	5.0	22	J	5.4	42		5.3	5.4	U	5.4
Indeno(1,2,3-cd)pyrene	PAH	180		12	83		11	80		12	82		12	12	U	12
Naphthalene	PAH	12	U	12	11	U	11	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	390		12	130		11	120		12	280		12	12	U	12
Pyrene	PAH	820		12	370		11	370		12	340	X	12	12	U	12
Aroclor-1016	PCB	2.6	UN	2.6	2.6	UN	2.6				2.7	U	2.7	2.8	U	2.8
Aroclor-1221	PCB	7.6	U	7.6	7.6	U	7.6				7.9	U	7.9	8.0	U	8.0
Aroclor-1232	PCB	1.9	U	1.9	1.9	U	1.9				2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.4	U	4.4	4.4	U	4.4				4.6	U	4.6	4.7	U	4.7
Aroclor-1248	PCB	36		4.4	25		4.4				4.6	U	4.6	4.7	U	4.7
Aroclor-1254	PCB	2.5	U	2.5	2.5	U	2.5				18		2.6	4.9	J	2.6
Aroclor-1260	PCB	2.5	U	2.5	2.5	U	2.5				2.6	U	2.6	2.6	U	2.6
Aldrin	PEST	0.25	U	0.25	0.26	U	0.26				0.24	U	0.24			
Alpha-BHC	PEST	0.21	U	0.21	0.22	U	0.22				0.21	U	0.21			
alpha-Chlordane	PEST	0.32	U	0.32	0.33	U	0.33				0.31	U	0.31			
beta-1,2,3,4,5,6-Hexachlorocyclohexane	PEST	0.65	U	0.65	0.68	U	0.68				0.64	U	0.64			
Delta-BHC	PEST	0.39	U	0.39	0.41	U	0.41				0.39	U	0.39			
Dichlorodiphenyldichloroethane	PEST	0.54	U	0.54	0.56	U	0.56				0.53	U	0.53			
Dichlorodiphenyldichloroethylene	PEST	0.23	U	0.23	0.24	U	0.24				0.23	U	0.23			
Dichlorodiphenyltrichloroethane	PEST	0.58	U	0.58	0.60	U	0.60				0.57	U	0.57			
Dieldrin	PEST	0.21	U	0.21	0.21	U	0.21				0.20	U	0.20			
Endosulfan I	PEST	0.17	U	0.17	0.18	U	0.18				0.17	U	0.17			
Endosulfan II	PEST	0.28	U	0.28	0.29	U	0.29				0.28	U	0.28			
Endosulfan sulfate	PEST	0.27	U	0.27	0.28	U	0.28				0.27	U	0.27			
Endrin	PEST	0.30	U	0.30	0.31	U	0.31				0.30	U	0.30			
Endrin aldehyde	PEST	0.17	U	0.17	0.17	U	0.17				0.17	U	0.17			
Endrin ketone	PEST	0.48	U	0.48	0.5	U	0.5				0.47	U	0.47			
Gamma-BHC (Lindane)	PEST	0.46	U	0.46	0.47	U	0.47				0.45	U	0.45			
gamma-Chlordane	PEST	0.53	JX	0.26	0.31	JX	0.27				0.27	JX	0.26			
Heptachlor	PEST	0.21	U	0.21	0.22	U	0.22				0.21	U	0.21			
Heptachlor epoxide	PEST	0.42	U	0.42	0.43	U	0.43				0.41	U	0.41			
Methoxychlor	PEST	0.44	U	0.44	0.46	U	0.46				0.43	U	0.43			
Toxaphene	PEST	16	U	16	16	U	16				15	U	15			
1,2,4-Trichlorobenzene	SVOA	27	U	27	27	U	27	29	U	29	27	U	27	29	U	29
1,2-Dichlorobenzene	SVOA	22	U	22	21	U	21	23	U	23	22	U	22	22	U	22
1,3-Dichlorobenzene	SVOA	12	U	12	12	U	12	12	U	12	12	U	12	12	U	12
1,4-Dichlorobenzene	SVOA	13	U	13	13	U	13	14	U	14	13	U	13	14	U	14
2,4,5-Trichlorophenol	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
2,4,6-Trichlorophenol	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
2,4-Dichlorophenol	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
2,4-Dimethylphenol	SVOA	65	U	65	64	U	64	68	U	68	65	U	65	67	U	67
2,4-Dinitrophenol	SVOA	330	U	330	320	U	320	340	U	340	330	U	330	340	U	340
2,4-Dinitrotoluene	SVOA	65	U	65	64	U	64	68	U	68	65	U	65	67	U	67
2,6-Dinitrotoluene	SVOA	27	U	27	27	U	27	29	U	29	27	U	27	29	U	29
2-Chloronaphthalene	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
2-Chlorophenol	SVOA	21	U	21	20	U	20	22	U	22	21	U	21	21	U	21
2-Methylnaphthalene	SVOA	19	U	19	19	U	19	19	U	19	19	U	19	19	U	19
2-Methylphenol (cresol, o-)	SVOA	13	U	13	13	U	13	13	U	13	13	U	13	13	U	13
2-Nitroaniline	SVOA	49	U	49	49	U	49	51	U	51	49	U	49	51	U	51
2-Nitrophenol	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
3,3'-Dichlorobenzidine	SVOA	88	U	88	88	U	88	92	U	92	88	U	88	92	U	92
3+4 Methylphenol (cresol, m+p)	SVOA	32	U	32	32	U	32	34	U	34	32	U	32	34	U	34
3-Nitroaniline	SVOA	72	U	72	71	U	71	75	U	75	71	U	71	75	U	75
4,6-Dinitro-2-methylphenol	SVOA	320	U	320	320	U	320	340	U	340	320	U	320	340	U	340
4-Bromophenylphenyl ether	SVOA	19	U	19	19	U	19	19	U	19	19	U	19	19	U	19
4-Chloro-3-methylphenol	SVOA	65	U	65	64	U	64	68	U	68	65	U	65	67	U	67
4-Chloroaniline	SVOA	80	U	80	80	U	80	84	U	84	80	U	80	84	U	84
4-Chlorophenylphenyl ether	SVOA	21	U	21	20	U	20	22	U	22	21	U	21	21	U	21
4-Nitroaniline	SVOA	71	U	71	71	U	71	74	U	74	71	U	71	74	U	74
4-Nitrophenol	SVOA	95	U	95	94	U	94	100	U	100	95	U	95	99	U	99

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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Organics)

CONSTITUENT	CLASS	SPA-7 J1K3V6 7/5/2011			SPA-7 resample 1* J1KNK3 8/9/2011			SPA-7 resample 2* J1KTJ6 8/23/2011			SPA-10 J1K3V9 7/5/2011			FS-1 J1KPJ9 8/16/2011		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Acenaphthene	SVOA	16	J	10	10	J	10	13	J	11	26	J	10	11	U	11
Acenaphthylene	SVOA	17	U	17	17	U	17	17	U	17	17	U	17	17	U	17
Anthracene	SVOA	37	J	17	19	J	17	25	J	17	36	J	17	17	U	17
Benzo(a)anthracene	SVOA	180	J	20	110	J	19	200	J	21	120	J	20	20	U	20
Benzo(a)pyrene	SVOA	160	J	20	91	J	19	230	J	21	92	J	20	20	U	20
Benzo(b)fluoranthene	SVOA	290	JK	26	160	J	26	400	K	27	150	JK	26	27	U	27
Benzo(ghi)perylene	SVOA	89	J	16	45	J	16	110	J	16	49	J	16	16	U	16
Benzo(k)fluoranthene	SVOA	39	UK	39	39	U	39	41	UK	41	39	UK	39	41	U	41
Bis(2-chloro-1-methylethyl)ether	SVOA	23	U	23	22	U	22	24	U	24	22	U	22	24	U	24
Bis(2-Chloroethoxy)methane	SVOA	23	U	23	22	U	22	24	U	24	22	U	22	24	U	24
Bis(2-chloroethyl) ether	SVOA	16	U	16	16	U	16	17	U	17	16	U	16	17	U	17
Bis(2-ethylhexyl) phthalate	SVOA	45	U	45	72	JB	45	100	JB	47	45	U	45	47	U	47
Butylbenzylphthalate	SVOA	42	U	42	42	U	42	44	U	44	42	U	42	44	U	44
Carbazole	SVOA	35	U	35	35	U	35	37	U	37	35	U	35	37	U	37
Chrysene	SVOA	210	J	26	120	J	26	240	J	28	140	J	26	28	U	28
Dibenz[a,h]anthracene	SVOA	19	U	19	19	U	19	19	U	19	19	U	19	19	U	19
Dibenzofuran	SVOA	20	U	20	19	U	19	21	U	21	20	U	20	20	U	20
Diethyl phthalate	SVOA	25	U	25	25	U	25	27	U	27	25	U	25	27	U	27
Dimethyl phthalate	SVOA	23	U	23	22	U	22	24	U	24	22	U	22	24	U	24
Di-n-butylphthalate	SVOA	28	U	28	28	U	28	30	U	30	28	U	28	30	U	30
Di-n-octylphthalate	SVOA	14	U	14	14	U	14	15	U	15	14	U	14	15	U	15
Fluoranthene	SVOA	340	J	35	200	J	35	270	J	37	250	J	35	37	U	37
Fluorene	SVOA	18	U	18	18	U	18	18	U	18	18	U	18	18	U	18
Hexachlorobenzene	SVOA	28	U	28	28	U	28	30	U	30	28	U	28	30	U	30
Hexachlorobutadiene	SVOA	9.8	U	9.8	9.7	U	9.7	10	U	10	9.8	U	9.8	10	U	10
Hexachlorocyclopentadiene	SVOA	49	U	49	49	U	49	51	U	51	49	U	49	51	U	51
Hexachloroethane	SVOA	21	U	21	21	U	21	22	U	22	21	U	21	22	U	22
Indeno(1,2,3-cd)pyrene	SVOA	79	J	22	42	J	21	98	J	23	46	J	22	22	U	22
Isophorone	SVOA	17	U	17	17	U	17	17	U	17	17	U	17	17	U	17
Naphthalene	SVOA	30	U	30	30	U	30	32	U	32	30	U	30	32	U	32
Nitrobenzene	SVOA	22	U	22	21	U	21	23	U	23	22	U	22	22	U	22
N-Nitroso-di-n-dipropylamine	SVOA	30	U	30	30	U	30	32	U	32	30	U	30	32	U	32
N-Nitrosodiphenylamine	SVOA	21	U	21	20	U	20	22	U	22	21	U	21	21	U	21
Pentachlorophenol	SVOA	320	U	320	320	U	320	340	U	340	320	U	320	340	U	340
Phenanthrene	SVOA	150	J	17	86	J	17	120	J	17	180	J	17	17	U	17
Phenol	SVOA	29	J	18	18	U	18	18	U	18	75	J	18	18	U	18
Pyrene	SVOA	350	J	12	210	J	12	290	J	12	260	J	12	12	U	12

Attachment	1	Sheet No.	30 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_SVOA)

Sample Location	HEIS Number	Sample Date	Acenaphthene			Acenaphthylene			Anthracene			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	9.6	U	9.6	16	U	16	16	U	16	42	J	19	42	J	19	70	JK	25
NX-5	J1K3N6	6/29/2011	34	J	10	140	J	17	200	J	17	450		20	380		20	620	K	26
NX-10	J1K3P1	6/29/2011	9.6	U	9.6	25	J	16	22	J	16	110	J	19	160	J	19	330	K	25
SX-12	J1K3V4	7/5/2011	55	J	9.8	16	U	16	85	J	16	220	J	19	170	J	19	290	J	25
Duplicate of J1K3V4	J1K3V5	7/5/2011	24	J	9.9	16	U	16	41	J	16	140	J	19	110	J	19	190	J	25
SX-2	J1K3T4	7/5/2011	17	J	9.8	16	U	16	30	J	16	230	J	19	210	J	19	360	K	25
SX-3	J1K3T5	7/5/2011	25	J	9.5	16	U	16	41	J	16	230	J	19	220	J	19	360	K	24
SX-6	J1K3T8	7/5/2011	76	J	10	17	U	17	110	J	17	280	J	20	220	J	20	370	K	26
SX-7	J1K3T9	7/5/2011	56	J	9.9	16	U	16	93	J	16	340		19	260	J	19	440	K	25
SX-9	J1K3V1	7/5/2011	35	J	10	17	U	17	63	J	17	360		19	330		19	570	K	26
SX-10	J1K3V2	7/5/2011	47	J	9.5	16	U	16	62	J	16	200	J	18	150	J	18	260	JK	24
SPA-7	J1K3V6	7/5/2011	16	J	10	17	U	17	37	J	17	180	J	20	160	J	20	290	JK	26
SPA-7 resample 1[a]	J1KNK3	8/9/2011	10	J	10	17	U	17	19	J	17	110	J	19	91	J	19	160	J	26
SPA-10	J1K3V9	7/5/2011	26	J	10	17	U	17	36	J	17	120	J	20	92	J	20	150	JK	26

Sample Location	HEIS Number	Sample Date	Benzo(ghi)perylene			Benzo(k)fluoranthene			Bis(2-ethylhexyl) phthalate			Carbazole			Chrysene			Di-n-butylphthalate		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	25	J	15	37	UK	37	69	JB	43	34	U	34	55	J	25	27	U	27
NX-5	J1K3N6	6/29/2011	200	J	16	39	UK	39	71	JB	45	98	J	35	480		26	28	U	28
NX-10	J1K3P1	6/29/2011	81	J	15	37	UK	37	75	JB	43	34	U	34	180	J	25	32	J	27
SX-12	J1K3V4	7/5/2011	84	J	15	38	U	38	44	U	44	41	J	34	260	J	26	130	J	28
Duplicate of J1K3V4	J1K3V5	7/5/2011	56	J	15	38	U	38	44	U	44	35	U	35	150	J	26	28	U	28
SX-2	J1K3T4	7/5/2011	110	J	15	38	UK	38	44	U	44	34	U	34	260	J	26	28	U	28
SX-3	J1K3T5	7/5/2011	110	J	15	37	UK	37	43	U	43	33	U	33	260	J	25	27	U	27
SX-6	J1K3T8	7/5/2011	110	J	16	39	UK	39	45	U	45	50	J	35	320		26	28	U	28
SX-7	J1K3T9	7/5/2011	130	J	15	39	UK	39	44	U	44	40	J	35	360		26	28	U	28
SX-9	J1K3V1	7/5/2011	180	J	16	39	UK	39	45	U	45	35	U	35	420		26	28	U	28
SX-10	J1K3V2	7/5/2011	76	J	15	37	UK	37	42	U	42	33	U	33	210	J	25	80	J	27
SPA-7	J1K3V6	7/5/2011	89	J	16	39	UK	39	45	U	45	35	U	35	210	J	26	28	U	28
SPA-7 resample 1[a]	J1KNK3	8/9/2011	45	J	16	39	U	39	72	JB	45	35	U	35	120	J	26	28	U	28
SPA-10	J1K3V9	7/5/2011	49	J	16	39	UK	39	45	U	45	35	U	35	140	J	26	28	U	28

Attachment	1	Sheet No.	31 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_SVOA)

Sample Location	HEIS Number	Sample Date	Di-n-octylphthalate			Dibenz(a,h)anthracene			Dibenzofuran			Fluoranthene			Fluorene			Indeno(1,2,3-cd)pyrene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	13	U	13	18	U	18	19	U	19	77	J	34	17	U	17	21	J	21
NX-5	J1K3N6	6/29/2011	14	U	14	72	J	19	83	J	20	1100		35	170	J	18	190	J	21
NX-10	J1K3P1	6/29/2011	13	U	13	23	J	18	19	U	19	180	J	34	23	J	17	76	J	21
SX-12	J1K3V4	7/5/2011	14	U	14	18	U	18	19	U	19	480		34	31	J	17	76	J	21
Duplicate of J1K3V4	J1K3V5	7/5/2011	14	U	14	18	U	18	19	U	19	290	J	35	17	U	17	50	J	21
SX-2	J1K3T4	7/5/2011	14	U	14	18	U	18	19	U	19	390		34	17	U	17	100	J	21
SX-3	J1K3T5	7/5/2011	13	U	13	18	U	18	19	U	19	430		33	17	U	17	110	J	20
SX-6	J1K3T8	7/5/2011	14	U	14	19	U	19	20	U	20	610		35	39	J	18	100	J	22
SX-7	J1K3T9	7/5/2011	14	U	14	18	U	18	19	U	19	650		35	27	J	17	120	J	21
SX-9	J1K3V1	7/5/2011	14	U	14	19	U	19	19	U	19	690		35	18	U	18	170	J	21
SX-10	J1K3V2	7/5/2011	13	U	13	18	U	18	18	U	18	410		33	22	J	17	76	J	20
SPA-7	J1K3V6	7/5/2011	14	U	14	19	U	19	20	U	20	340		35	18	U	18	79	J	22
SPA-7 resample 1[a]	J1KNK3	8/9/2011	14	U	14	19	U	19	19	U	19	200	J	35	18	U	18	42	J	21
SPA-10	J1K3V9	7/5/2011	14	U	14	19	U	19	20	U	20	250	J	35	18	U	18	46	J	22

Sample Location	HEIS Number	Sample Date	2-Methylnaphthalene			Naphthalene			Phenanthrene			Phenol			Pyrene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	18	U	18	29	U	29	36	J	16	17	U	17	79	J	11
NX-5	J1K3N6	6/29/2011	44	J	19	70	J	30	1100		17	18	U	18	1000		12
NX-10	J1K3P1	6/29/2011	18	U	18	29	U	29	170	J	16	17	U	17	220	J	11
SX-12	J1K3V4	7/5/2011	18	U	18	30	U	30	370		16	17	U	17	490		12
Duplicate of J1K3V4	J1K3V5	7/5/2011	18	U	18	30	U	30	180	J	16	17	U	17	290	J	12
SX-2	J1K3T4	7/5/2011	18	U	18	30	U	30	140	J	16	17	U	17	440		12
SX-3	J1K3T5	7/5/2011	18	U	18	29	U	29	180	J	16	17	U	17	480		11
SX-6	J1K3T8	7/5/2011	19	U	19	30	U	30	450		17	18	U	18	630		12
SX-7	J1K3T9	7/5/2011	18	U	18	30	U	30	390		16	17	U	17	700		12
SX-9	J1K3V1	7/5/2011	19	U	19	30	U	30	300	J	17	18	U	18	730		12
SX-10	J1K3V2	7/5/2011	18	U	18	29	U	29	280	J	16	17	U	17	430		11
SPA-7	J1K3V6	7/5/2011	19	U	19	30	U	30	150	J	17	29	J	18	350		12
SPA-7 resample 1[a]	J1KNK3	8/9/2011	19	U	19	30	U	30	86	J	17	18	U	18	210	J	12
SPA-10	J1K3V9	7/5/2011	19	U	19	30	U	30	180	J	17	75	J	18	260	J	12

Attachment	1	Sheet No.	32 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_Pesticides)

Sample Location	HEIS Number	Sample Date	alpha-Chlordane			Dichlorodiphenyl dichloroethylene			Dichlorodiphenyl trichloroethane			Dieldrin			gamma-Chlordane		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	3.2	UD	3.2	2.3	UD	2.3	5.8	UD	5.8	75	D	2.1	2.6	UD	2.6
NX-5	J1K3N6	6/29/2011	3.2	UD	3.2	2.3	UD	2.3	5.8	UD	5.8	2.1	UD	2.1	2.6	UD	2.6
NX-10	J1K3P1	6/29/2011	22	D	3.0	2.2	UD	2.2	5.4	UD	5.4	1.9	UD	1.9	20	D	2.5
SPA-7	J1K3V6	7/5/2011	0.32	U	0.32	0.23	U	0.23	0.58	U	0.58	0.21	U	0.21	0.53	JX	0.26
SPA-7 resample 1[a]	J1KNK3	8/9/2011	0.33	U	0.33	0.24	U	0.24	0.6	U	0.60	0.21	U	0.21	0.31	JX	0.27
SPA-10	J1K3V9	7/5/2011	0.31	U	0.31	0.23	U	0.23	0.57	U	0.57	0.20	U	0.20	0.27	JX	0.26

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_PCB)

Sample Location	HEIS Number	Sample Date	Aroclor-1248			Aroclor-1254			Aroclor-1260		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	4.5	U	4.5	2.5	U	2.5	8.4	J	2.5
NX-5	J1K3N6	6/29/2011	4.5	U	4.5	2.5	U	2.5	2.5	U	2.5
NX-10	J1K3P1	6/29/2011	4.6	U	4.6	2.6	U	2.6	25	P	2.6
SX-12	J1K3V4	7/5/2011	90		4.6	2.6	U	2.6	4.2	JP	2.6
Duplicate of J1K3V4	J1K3V5	7/5/2011	41		4.6	2.6	U	2.6	4.6	J	2.6
SX-2	J1K3T4	7/5/2011	25		4.8	2.7	U	2.7	4.0	JP	2.7
SX-3	J1K3T5	7/5/2011	1200	D	46	25	UD	25	25	UD	25
SX-6	J1K3T8	7/5/2011	23		4.4	2.5	U	2.5	2.5	U	2.5
SX-7	J1K3T9	7/5/2011	42		4.6	2.6	U	2.6	2.6	U	2.6
SX-9	J1K3V1	7/5/2011	65		4.4	2.5	U	2.5	7.5	JP	2.5
SX-10	J1K3V2	7/5/2011	750	D	45	25	UD	25	25	UD	25
SPA-7	J1K3V6	7/5/2011	36		4.4	2.5	U	2.5	2.5	U	2.5
SPA-7 resample 1[a]	J1KNK3	8/9/2011	25		4.4	2.5	U	2.5	2.5	U	2.5
SPA-10	J1K3V9	7/5/2011	4.6	U	4.6	18		2.6	2.6	U	2.6

Attachment	1	Sheet No.	33 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_PAH)

Sample Location	HEIS Number	Sample Date	Acenaphthene			Acenaphthylene			Anthracene			Benzo(a)anthracene			Benzo(a)pyrene			Benzo(b)fluoranthene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	10	U	10	9.0	U	9.0	3.1	U	3.1	3.2	U	3.2	18		6.4	20	X	4.2
NX-5	J1K3N6	6/29/2011	9.9	U	9.9	19.0	J	8.9	59	X	3.0	220		3.2	180		6.4	140	X	4.2
NX-10	J1K3P1	6/29/2011	9.6	U	9.6	8.6	U	8.6	7.7	JX	2.9	59		3.1	110		6.2	92	X	4.0
SX-12	J1K3V4	7/5/2011	9.8	U	9.8	8.8	U	8.8	28		3.0	160		3.1	130		6.3	94	X	4.1
Duplicate of J1K3V4	J1K3V5	7/5/2011	9.8	U	9.8	8.9	U	8.9	31		3.0	130		3.1	97	X	6.3	71		4.1
SX-2	J1K3T4	7/5/2011	9.9	U	9.9	8.9	U	8.9	90		3.0	280	XN	3.2	280		6.3	190		4.1
SX-3	J1K3T5	7/5/2011	10	U	10	9.0	U	9.0	63		3.0	250	X	3.2	220		6.4	180		4.2
SX-6	J1K3T8	7/5/2011	9.3	U	9.3	8.4	U	8.4	46		2.8	180	X	3.0	140		6.0	100	X	3.9
SX-7	J1K3T9	7/5/2011	9.5	U	9.5	8.5	U	8.5	100	X	2.9	410		3.0	320		6.1	250		4.0
SX-9	J1K3V1	7/5/2011	10	U	10	9.0	U	9.0	340	X	3.1	2000	X	3.2	1700		6.4	1200		4.2
SX-10	J1K3V2	7/5/2011	9.3	U	9.3	8.3	U	8.3	21		2.8	130		3.0	110		5.9	65		3.9
SPA-7	J1K3V6	7/5/2011	9.8	U	9.8	8.8	U	8.8	99	X	3.0	390		3.1	300		6.3	250		4.1
SPA-7 resample 1[a]	J1KNK3	8/9/2011	9.4	U	9.4	8.5	U	8.5	33	X	2.9	170		3.0	140		6.0	110		4.0
SPA-7 resample 2[a]	J1KTJ6	8/26/2011	10	U	10	9.2	U	9.2	25	X	3.1	180		3.3	150		6.6	150		4.3
SPA-10	J1K3V9	7/5/2011	10	U	10	9.0	U	9.0	96		3.0	230		3.2	150		6.4	100		4.2

Sample Location	HEIS Number	Sample Date	Benzo(ghi)perylene			Benzo(k)fluoranthene			Chrysene			Dibenz(a,h)anthracene			Fluoranthene			Fluorene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	10	J	7.2	7.4	J	3.9	25	J	4.8	11	U	11	26	J	13	8.4	J	5.3
NX-5	J1K3N6	6/29/2011	80		7.1	69		3.9	220		4.8	21	JX	11	490		13	67		5.2
NX-10	J1K3P1	6/29/2011	21	JX	6.9	55		3.8	100		4.6	11	U	11	100		12	7.2	J	5.1
SX-12	J1K3V4	7/5/2011	46		7.1	63		3.9	140		4.7	19	JX	11	240		13	5.2	U	5.2
Duplicate of J1K3V4	J1K3V5	7/5/2011	36		7.1	35		3.9	120		4.8	11	UX	11	230		13	20	J	5.2
SX-2	J1K3T4	7/5/2011	120		7.1	120		3.9	260		4.8	55	X	11	500	N	13	39		5.2
SX-3	J1K3T5	7/5/2011	130		7.2	96		3.9	220		4.8	64	X	11	390		13	5.3	U	5.3
SX-6	J1K3T8	7/5/2011	48		6.7	68		3.7	160		4.5	18	JX	10	320		12	16	J	4.9
SX-7	J1K3T9	7/5/2011	150		6.8	160		3.7	360		4.6	63	X	10	730		12	69		5.0
SX-9	J1K3V1	7/5/2011	470	X	7.2	720		4.0	1800		4.9	320	X	11	3400		13	230		5.3
SX-10	J1K3V2	7/5/2011	37	X	6.7	44		3.7	100		4.5	10	U	10	190		12	7.6	J	4.9
SPA-7	J1K3V6	7/5/2011	140		7.0	150		3.9	370		4.7	55	X	11	700		13	69		5.2
SPA-7 resample 1[a]	J1KNK3	8/9/2011	28	X	6.8	55		3.7	160		4.6	10	U	10	330		12	24	J	5.0
SPA-7 resample 2[a]	J1KTJ6	8/26/2011	61		7.4	53	X	4.0	170		5.0	19	JX	11	300		13	22	J	5.4
SPA-10	J1K3V9	7/5/2011	50		7.2	71		3.9	190		4.8	14	JX	11	430		13	42		5.3

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Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
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Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results (Info only_Organic with detects_PAH)

Sample Location	HEIS Number	Sample Date	Indeno(1,2,3-cd)pyrene			Naphthalene			Phenanthrene			Pyrene		
			ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
NX-4	J1K3N5	6/29/2011	20	J	12	12	U	12	13	J	12	25	JX	12
NX-5	J1K3N6	6/29/2011	120		12	12	U	12	430		12	460		12
NX-10	J1K3P1	6/29/2011	53		12	12	U	12	65		12	140		12
SX-12	J1K3V4	7/5/2011	69	X	12	12	U	12	88		12	300		12
Duplicate of J1K3V4	J1K3V5	7/5/2011	53		12	12	U	12	110		12	280		12
SX-2	J1K3T4	7/5/2011	140		12	12	U	12	220		12	430		12
SX-3	J1K3T5	7/5/2011	140		12	12	U	12	110		12	500		12
SX-6	J1K3T8	7/5/2011	74		11	11	U	11	150		11	380		11
SX-7	J1K3T9	7/5/2011	170		11	11	U	11	390		11	870		11
SX-9	J1K3V1	7/5/2011	940		12	12	U	12	1200		12	2800	X	12
SX-10	J1K3V2	7/5/2011	46		11	11	U	11	78		11	230		11
SPA-7	J1K3V6	7/5/2011	180		12	12	U	12	390		12	820		12
SPA-7 resample 1"	J1KNK3	8/9/2011	83		11	11	U	11	130		11	370		11
SPA-7 resample 2"	J1KTJ6	8/26/2011	80		12	12	U	12	120		12	370		12
SPA-10	J1K3V9	7/5/2011	82		12	12	U	12	280		12	340	X	12

Attachment	1	Sheet No.	35 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglic	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results -TCLP Metal

Sample Location	HEIS Number	Sample Date	TCLP-Arsenic			TCLP-Barium			TCLP-Cadmium			TCLP-Chromium		
			mg/L	Q	PQL	mg/L	Q	PQL	mg/L	Q	PQL	mg/L	Q	PQL
NX-4	J1K3N5	6/29/2011	0.022	U	0.022	0.32	B	0.0020	0.0020	U	0.0020	0.0069	B	0.0030

Sample Location	HEIS Number	Sample Date	TCLP-Lead			TCLP-Mercury			TCLP-Selenium			TCLP-Silver		
			mg/L	Q	PQL	mg/L	Q	PQL	mg/L	Q	PQL	mg/L	Q	PQL
NX-4	J1K3N5	6/29/2011	0.013	U	0.013				0.024	U	0.024	0.0040	U	0.0040
SX-2	J1K3T4	7/5/2011				0.0098		0.000030						
SX-5	J1K3T7	7/5/2011				0.013	N	0.000060						

Attachment 1. 100-F-55/100-F-62 Waste Site Verification Sample Results - Resample (Physical)

Sample Location	HEIS Number	Sample Date	Percent moisture (wet		
			%	Q	PQL
NX-4 resample 1[a]	J1KNK0	8/9/2011	6.4		0.10
NX-5 resample 1[a]	J1KNK1	8/9/2011	7.8		0.10
NX-10 resample 1[a]	J1KNK2	8/9/2011	4.3		0.10
SX-12 resample 1[a]	J1KNL1	8/10/2011	0.19		0.10
Duplicate of J1KNL1 resample 1[a]	J1KNL2	8/10/2011	0.20		0.10
SX-2 resample 1[a]	J1KNK5	8/10/2011	9.6		0.10
SX-3 resample 1[a]	J1KNK6	8/10/2011	1.0		0.10
SX-6 resample[a]	J1KNK7	8/10/2011	0.52		0.10
SX-7 resample 1[a]	J1KNK8	8/10/2011	4.2		0.10
SX-9 resample 1[a]	J1KNK9	8/10/2011	0.53		0.10
SX-10 resample 1[a]	J1KNL0	8/10/2011	0.19		0.10
SPA-7 resample 1[a]	J1KNK3	8/9/2011	3.2		0.10
SPA-7 resample 2[a]	J1KTJ6	8/26/2011	4.1		0.10
SPA-7 resample 3[a]	J1863	9/6/2011	0.38		0.10
SPA-10 resample 1[a]	J1KNK4	8/9/2011	0.71		0.10

Attachment	1	Sheet No.	36 of 36
Originator	N. Kobayashi	Date	09/29/11
Checked	J. D. Skoglie	Date	09/29/11
Calc. No.	0100F-CA-V0392	Rev. No.	0

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-F

Discipline: Environmental Calculation No: 0100F-CA-V0399

Subject: 100-F-55/100-F-62 Waste Sites Direct Contact Hazard Quotient and Carcinogenic Risk Calculation

Computer Program: Excel Program No: Excel 2003

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

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Summary = 4 Total = 5	N. Kobayashi N. Kobayashi	J.D. Skoglie	T.Q. Howell TQ Howell	S.W. Callison SW Call	9-29-11

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007)

DE01-437.03

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	N. Kobayashi	Date:	9/29/2011	Calc. No.:	0100F-CA-V0399	Rev.:	0
Project:	100-F Field Remediation	Job No:	14655	Checked:	J.D. Skoglie	Date:	9/29/2011
Subject:	100-F-55/100-F-62 Waste Sites 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 100-F-55 and 100-F-62 waste sites. 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 100-F-55, 1607-F7 Contaminated Ash Layer and the 100-F-62, Animal Farm Septic Lines, Attachment to Waste Site Reclassification Form 2011-083 and 2011-104, 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:	N. Kobayashi	Date:	9/29/2011	Calc. No.:	0100F-CA-V0399	Rev.:	0
Project:	100-F Field Remediation	Job No:	14655	Checked:	J.D. Skoglie	Date:	9/29/2011
Subject:	100-F-55/100-F-62 Waste Sites Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 2 of 4	

METHODOLOGY:

The 100-F-55 and 100-F-62 waste sites are comprised of a total of three decision units for verification sampling, consisting of the north and south excavations and the stock pile area. The direct contact hazard quotient and carcinogenic risk calculations for the 100-F-55 and 100-F-62 waste sites were conservatively calculated for the entire waste site using the statistical verification soil sample results (WCH 2011). Of the contaminants of potential concern (COPCs) for this site, boron, hexavalent chromium, molybdenum, polycyclic aromatic hydrocarbons, pesticides, polychlorinated biphenyls, and semivolatiles require HQ and risk calculations because these analytes were detected and Washington State or Hanford Site background values are not available. Barium, mercury, silver, and zinc require HQ and risk calculations because these analytes were detected above background. 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. 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 barium is 157 mg/kg, divided by the noncarcinogenic RAG value of 5,600 mg/kg (calculated in accordance with the noncarcinogenic toxics effects formula in WAC 173-340-740[3]), is 2.8×10^{-2}. Comparing this value, and all other individual values, to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation. The sum of the HQ values is 3.5×10^{-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, then multiplied by 1.0×10^{-6}. For example, the statistical value for benzo(a)anthracene is 0.172 mg/kg, divided by 1.37 mg/kg, and multiplied as indicated, is 1.3×10^{-7}. 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 2.9×10^{-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
4) List the cumulative excess cancer risk for carcinogens $>1 \times 10^{-5}$: None

Table 1 shows the results of the hazard quotient and excess cancer risk calculations.

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	N. Kobayashi	Date:	9/29/2011	Calc. No.:	0100F-CA-V0399	Rev.:	0
Project:	100-F Field Remediation	Job No:	14655	Checked:	J.D. Skoglie	Date:	9/29/2011
Subject:	100-F-55/100-F-62 Waste Sites Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 3 of 4	

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 100-F-55/100-F-62 Waste Sites (2 pages)

Contaminants of Potential Concern	Maximum or Statistical Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Barium	157	5,600	2.8E-02	--	--
Boron	8.3	7,200	1.2E-03	--	--
Hexavalent Chromium[c]	0.749	240	3.1E-03	2.1	3.6E-07
Lead[d]	36.0	353	--	--	--
Mercury	6.8	24	2.8E-01	--	--
Molybdenum	0.39	400	9.8E-04	--	--
Silver	0.97	400	2.4E-03	--	--
Zinc	74.8	24,000	3.1E-03	--	--
Polycyclic Aromatic Hydrocarbons					
Acenapthene	0.016	4,800	3.3E-06	--	--
Acenapthylene[e]	0.027	4,800	5.6E-06	--	--
Anthracene	0.026	24,000	1.1E-06	--	--
Benzo(a)anthracene	0.172	--	--	1.37	1.3E-07
Benzo(a)pyrene	0.127	--	--	0.137	9.3E-07
Benzo(b)fluoranthene	0.196	--	--	1.37	1.4E-07
Benzo(ghi)perylene[e]	0.048	2,400	2.0E-05	--	--
Benzo(k)fluoranthene	0.087	--	--	1.37	6.4E-08
Chrysene	0.44	--	--	13.7	3.2E-08
Dibenz(a,h)anthracene	0.023	--	--	1.37	1.7E-08
Fluoranthene	0.492	3,200	1.5E-04	--	--
Fluorene	0.017	3,200	5.3E-06	--	--
Indeno(1,2,3-cd)pyrene	0.063	--	--	1.37	4.6E-08
Phenanthrene[e]	0.093	24,000	3.9E-06	--	--
Pyrene	0.709	2,400	3.0E-04	--	--
Pesticides					
Chlordane (alpha, gamma)	0.046	40	1.2E-03	2.86	1.6E-08
DDE, 4,4'-	0.0069	--	--	2.94	2.3E-09
DDT, 4,4'-	0.0074	40	1.9E-04	2.94	2.5E-09
Dieldrin	0.037	4	9.3E-03	0.0625	5.9E-07
Polychlorinated Biphenyls					
Aroclor-1248	0.24	--	--	0.5	4.8E-07
Aroclor-1254	0.024	1.6	1.5E-02	0.5	4.8E-08
Aroclor-1260	0.046	--	--	0.5	9.2E-08

APPENDIX B

DATA QUALITY ASSESSMENT

APPENDIX B

DATA QUALITY ASSESSMENT

VERIFICATION SAMPLING DATA QUALITY ANALYSIS

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 2011b). This DQA was performed in accordance with site-specific data quality objectives found in the *100 Area Remedial Action Sampling and Analysis Plan* (100 Area SAP) (DOE-RL 2009).

A review of the sample design (WCH 2011b), the field logbooks (WCH 2011a), 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 sampling and analysis plan (SAP) data assurance requirements and the data validation procedures for chemical and radiochemical analysis (BHI 2000a, 2000b) are used as appropriate. This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use (i.e., decision-making purposes). The DQA completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process (EPA 2006).

Verification sample data collected at the 100-F-55 and 100-F-62 waste sites were provided by the laboratories in nine sample delivery groups (SDGs): SDG J01151, J01152, J01154, J01156, JP0265, JP0266, JP0278, JP0293, and JP0311. SDG J01151 was submitted for third-party validation.

Samples in the 100-F-55 and 100-F-62 data set were analyzed using gamma spectroscopy – gamma energy analysis (GEA), U.S. Environmental Protection Agency (EPA) method 6010 (inductively coupled plasma [ICP] metals), EPA method 7471 (mercury), EPA method 8270 (semivolatile organic compounds [SVOCs]), EPA method 7196 (hexavalent chromium), EPA method 8081 (pesticides), EPA method 8082 (polychlorinated biphenyl [PCBs]), and EPA method 8310 (polycyclic aromatic hydrocarbons [PAHs]). The ICP metals include antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc.

Major Deficiencies

Major deficiencies were noted in SDG J01152 and SDG JP0265. In the SVOC analysis for SDG JP0265, the matrix spike (MS) and matrix spike duplicate (MSD) recoveries for 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol were 0%. All data for 2-methylphenol and 2,4-dinitrophenol in SDG JP0265 have been qualified by the project as rejected and assigned "R" flags.

In the pesticide analysis for SDG J01152, the MS and MSD recoveries for 4, 4'-DDD were 0%. All data for 4, 4'-DDD in SDG J01152 have been qualified by the project as rejected and assigned "R" flags.

The rejected data are associated with acceptable laboratory control samples and calibration curves in both analyses. This indicates that the analytical equipment was operating within acceptable parameters and is not the source of these deficiencies.

Rather, the source of the deficiencies appears to be the sample matrix. The 100-F-55 waste site is a contaminated ash layer waste site, which is speculated to be coal that was transported by railcar to the powerhouse (located just north of the site) or coal ash that was reportedly used as fill in low areas (WCH 2007). A portion of the 100-F-62 pipeline is adjacent to the 100-F-55 waste, and is located across the street and just south of the former coal pit (WIDS 100-F-48 waste site). Because of the presence of the ash layer and the proximity to the coal ash pit, the samples associated with these results, as evidenced by the chemical behavior during analysis, more closely resemble coal ash than soil. Coal ash is similar to activated carbon in that it can effectively adsorb organic compounds such as 4,4'-DDD, 4,6-dinitro-2-methylphenol, and 2,4-dinitrophenol. Activated carbon is commonly used in water and air filters to exploit this adsorptive property. Unfortunately, this property of the sample matrix has, in this case, compromised the extraction procedure. Re-analysis of the samples would be expected to have similar results.

There is no evidence these analytes exist in the field samples or at the 100-F-55 and 100-F-62 waste sites. However, if these analytes do exist in the field samples, they cannot be released from the sample matrix through normal chemical extraction procedures and would not be mobilized by conditions found at the 100-F-55 and 100-F-62 waste sites. It is concluded that residual concentrations of 4,4'-DDD, 4,6-dinitro-2-methylphenol, and 2,4-dinitrophenol at the 100-F-55 and 100-F-62 waste sites do not pose any threat to terrestrial plants and animals, groundwater, or the river and meet the remedial action objectives (RAOs) for the 100-F-55 and 100-F-62 waste sites.

Minor Deficiencies

Minor deficiencies are discussed by SDG as follows below. If no comments are made about a specific analysis, it should be assumed that no deficiencies in the quality of the data were found. Unless otherwise noted, deficiencies listed below are specific to the individual SDG, but apply to all samples within that SDG.

SDG J01151

This SDG comprises seven field samples (J1K3R4 through J1K3R9 and J1K3T0) collected from the stockpile areas at the 100-F-55 and 100-F-62 waste sites. Sample J1K3T0 is a field duplicate of sample J1K3R4. SDG J01151 was submitted for formal third-party validation. Minor deficiencies found in SDG J01151 are as follows:

In the hexavalent chromium analysis, the MS recovery (58%) was below project acceptance criteria (70-130 %). Third-party validation has qualified all hexavalent chromium results in SDG J01151 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the common laboratory contaminant bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration less than the required quantitation limit (RQL). Third-party validation has qualified all detected bis(2-ethylhexyl)phthalate results in SDG J01151 as undetected, raised the results to the RQL, and flagged "U."

In the pesticide analysis, the laboratory did not prepare a MS, MSD, or laboratory control standard (LCS) for toxaphene. Third-party validation qualified all toxaphene results in SDG J01151 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon (17%) was below project acceptance criteria (70-130%). Third-party validation has qualified all silicon results in SDG J01151 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon (17%) and antimony (37%) were below project acceptance criteria (70-130 %). Third-party validation has qualified all silicon and antimony results in SDG J01151 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

SDG J01156

This SDG comprises nine field samples (J1K3V6 through J1K3V9 and J1K3W0 through J1K3W4) from the stockpile area of the 100-F-55 and 100-F-62 waste sites. Sample J1K3W4 is a field duplicate of sample J1K3V7. The SVOA, PAH, Pesticide, and PCB data for sample J1K3V6 were replaced by sample J1L863, which was analyzed in SDG JP0311. The SVOA, PAH, Pesticide, and PCB data for sample J1K3V9 were replaced by data for sample J1KNK4, which was analyzed in SDG JP0266. Minor deficiencies noted in SDG J01156 are as follows:

In the pesticide analysis, the laboratory did not prepare a MS, MSD, or LCS for toxaphene. All toxaphene results in SDG J01156 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, low levels of barium and zinc were detected in the method blank. All detected barium and zinc results in SDG J01156 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon (15%) was below project acceptance criteria (70-130%). All silicon results in SDG J01156 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon (11%) and antimony (44%) were below project acceptance criteria (70-130 %). All silicon and antimony results in SDG J01156 may be considered estimated. Estimated data are usable for decision-making purposes.

In the mercury analysis, the MS recovery (221%) was above project acceptance criteria (70-130 %). All mercury results in SDG J01156 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG J01152

This SDG comprises 14 field samples (J1K3N2 through J1K3N9 and J1K3P0 through J1K3P4) from the north excavation area of the 100-F-55 and 100-F-62 waste sites. Sample J1K3P4 is a field duplicate of sample J1K3P0. Sample J1K3P5 is the equipment blank. The SVOA, PAH, Pesticide, and PCB data for samples J1K3N5, J1K3N6, and J1K3P1 were replaced by samples J1KNK0, J1KNK1, and J1KNK2, which were analyzed in SDG JP0265. Minor deficiencies noted in SDG J01152 are as follows:

In the hexavalent chromium analysis, the MS recovery (39%) was below project acceptance criteria (70-130 %). All hexavalent chromium results in SDG J01152 may be considered estimated. Estimated data are usable for decision-making purposes.

In the SVOC analysis, the common laboratory contaminant bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration less than the RQL. The detected results for bis(2-ethylhexyl)phthalate in SDG J01152 may be considered estimated. Estimated data are usable for decision-making purposes.

In the pesticide analysis, the laboratory did not prepare a MS, MSD, or LCS for toxaphene. All toxaphene results in SDG J01152 may be considered estimated. Estimated data are usable for decision-making purposes.

In the PCB analysis, the samples appeared to contain PCBs; however, due to weathering (or other environmental processes), the PCBs in the samples did not closely match any of the laboratory's aroclor standards used for instrument calibration. Results were reported as aroclor-1260, but with increased uncertainty. All detected aroclor results in SDG J00152 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon (20%) was below project acceptance criteria (70-130%). All silicon results in SDG J01152 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon (21%) and antimony (43%) were below project acceptance criteria (70-130 %). All silicon and antimony results in SDG J01152 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG J01154

This SDG comprises 14 field samples (J1K3T3 through J1K3T9 and J1K3V0 through J1K3V5) from the south excavation area of the 100-F-55 and 100-F-62 waste sites. Sample J1K3V5 is a field duplicate of sample J1K3V4. Sample J1K3W5 is the equipment blank. The SVOA, PAH, Pesticide, and PCB data for samples J1K3T4, J1K3T5, J1K3T8, J1K3T9, J1K3V1, J1K3V2, J1K3V4, and J1K3V5 were replaced by samples J1KNK5, J1KNK6, J1KNK7, J1KNK8, J1KNK9, J1KNL0, J1KNL1, and J1KNL2, which were analyzed in SDG JP0266. Minor deficiencies noted in SDG J01152 are as follows:

In the PCB analysis, the MS and MSD recoveries for aroclor-1016 (699% and 936%) were above the acceptance criteria (50-150%). All aroclor-1016 results in SDG J01154 may be considered estimated. Estimated data are usable for decision making purposes.

In the ICP metals analysis, the LCS recovery for silicon (17%) was below project acceptance criteria (70-130%). All silicon results in SDG J01154 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon (23%) and antimony (66%) were below project acceptance criteria (70-130 %). All silicon and antimony results in SDG J01154 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG JP0266

This SDG comprises eight soil samples (J1KNK5 through J1KNK9) from the south excavation of the 100-F-55 and 100-F-62 waste sites. This SDG provides SVOA, PAH, and PCB replacement data for samples in SDG J01154. Minor deficiencies noted in SDG JP0266 are as follows:

In the SVOC analysis, the MS recovery for 2,4-dinitrophenol (46%) was below the acceptance criteria (50-150%). All 2,4-dinitrophenol results in SDG JP0266 may be considered estimated. Estimated data are usable for decision making purposes.

SDG JP0265

This SDG comprises five soil samples (J1KNK0 through J1KNK4) from the north excavation and stockpile area of the 100-F-55 and 100-F-62 waste sites. This SDG provides SVOA, PAH, pesticide, and PCB replacement data for samples in SDGs J01151 and J01152. Minor deficiencies noted in SDG JP0265 are as follows:

In the SVOC analysis, the common laboratory contaminant bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration less than the CRQL. The detected results for bis(2-ethylhexyl)phthalate in SDG JP0265 may be considered estimated. Estimated data are usable for decision-making purposes.

In the pesticide analysis, the laboratory did not prepare a MS, MSD, or LCS for toxaphene. All toxaphene results in SDG JP0265 may be considered estimated. Estimated data are usable for decision-making purposes.

In the pesticide analysis, the MS and MSD recoveries for endosulfan sulfate (43% and 35%, respectively) and the MS recovery for endrin aldehyde (47%) were below the acceptance criteria (50-150%). All endosulfan sulfate and endrin aldehyde results in SDG JP0265 may be considered estimated. Estimated data are usable for decision making purposes.

In the PCB analysis, the MS and MSD recoveries for aroclor-1016 (164% and 152%, respectively) were above the acceptance criteria (50-150%). All aroclor-1016 results in SDG JP0265 may be considered estimated. Estimated data are usable for decision making purposes.

SDG JP0311

This SDG comprises a single soil sample (J1L863) from the 100-F-55 and 100-F-62 waste sites. Minor deficiencies noted in SDG JP0311 are as follows:

In the SVOC analysis, the MS and MSD recoveries for 2,4-dinitrophenol (46% and 49%, respectively) were below project acceptance criteria (50-150 %). All 2,4-dinitrophenol results in SDG JP0311 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG JP0278

This SDG comprises a single soil sample (J1KPJ9) from the 100-F-55 and 100-F-62 waste sites. Minor deficiencies noted in SDG JP0278 are as follows:

In the SVOC analysis the MS and MSD recoveries for 2,4-dinitrophenol (45% and 37%, respectively) were below project acceptance criteria (50-150 %). All 2,4-dinitrophenol results in SDG JP0278 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon (19%) was below project acceptance criteria (70-130%). All silicon results in SDG JP0278 may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon (25%) and antimony (64%) were below acceptance criteria (70-130 %). All silicon and antimony results in SDG JP0278 may be considered estimated. Estimated data are usable for decision-making purposes.

SDG JP0293

This SDG comprises a single soil sample (J1KTJ6) from the 100-F-55 and 100-F-62 waste sites. Minor deficiencies noted in SDG JP0293 are as follows:

In the SVOC analysis, the common laboratory contaminant bis(2-ethylhexyl)phthalate was detected in the method blank at a concentration less than the CRQL. The detected results for bis(2-ethylhexyl)phthalate in SDG JP0293 may be considered estimated. Estimated data are usable for decision-making purposes.

In the SVOC analysis the MS and MSD recoveries for 4,6-dinitro-2-methylphenol (39% and 45%) and 2,4-dinitrophenol (22% and 30%) were below project acceptance criteria (50-150 %). All 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol results in SDG JP0293 may be considered estimated. Estimated data are usable for decision-making purposes.

FIELD QUALITY ASSURANCE/QUALITY CONTROL

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

Field quality-assurance/quality-control (QA/QC) measures are used to assess potential sources of error and cross contamination of samples that could bias results. Four sets of field QA/QC samples (main sample and duplicate) were collected, as documented in the field logbook (WCH 2011a). The first QA/QC set comprises samples J1K3P0 (main) and J1K3P4 (duplicate) from the north excavation. The second QA/QC set comprises samples J1K3V4 (main) and J1K3V5 (duplicate) from the south excavation. The third QA/QC set comprises samples J1K3V7 (main) and J1K3W4 (duplicate) from the east stockpile. The fourth QA/QC set comprises samples J1K3R4 (main) and J1K3T0 (duplicate) from the north stockpile.

The entire sample data set including the duplicate sample data are presented in the 95% upper confidence limit (UCL) calculation in Appendix A. Relative percent differences (RPDs) for the field duplicate samples have been calculated and are also presented in the 95% UCL calculation. Please refer to the 95% UCL calculation for details.

Field duplicate samples 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 relative percent difference RPD of the sample/duplicate pair(s), for each contaminant of concern. No major deficiencies in the RPD calculations were found for the duplicate samples. The only minor deficiencies noted were for the east stockpile and are discussed below. The RPDs calculated for all other decision units were less than 30%.

East Stockpile

In the duplicate evaluation, the RPDs calculated for barium (361.5%) and PAH-fluoranthene (58.1%) were above the field duplicate acceptance criteria (less than 30%). Elevated RPDs in environmental samples are generally attributed to natural heterogeneity in the sample matrix. The data are usable for decision-making purposes.

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

SUMMARY

Limited, random, or sample matrix-specific influenced batch QC issues such as those discussed above are a potential for any analysis. The number and types seen in these data sets are within expectations for the matrix types and analyses performed. The DQA review of the 100-F-55 and 100-F-62 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 the 100-F-55 and 100-F-62 waste sites concludes that the reviewed data are of the right type, quality, and quantity to support the intended use, with the exception of the rejected data discussed above. Detection limits, precision, accuracy, and sampling data group completeness were assessed to determine if any analytical results should be rejected as a result of QA and QC deficiencies. With the exception of the rejected 4,4'-DDD, 4,6-dinitro-2-methylphenol, and 2,4-dinitrophenol data, the analytical data were found acceptable for decision-making purposes. The verification sample analytical data are stored in the Environmental Restoration project-specific database prior to being submitted for inclusion in the HEIS database. The verification sample analytical data are also summarized in Appendix A.

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